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ADDRESS.

ADDRESS IN MEDICINE.

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BRITISH MEDICINE IN GREATER BRITAIN.—THE MAKING OF GREATER BRITAIN.

To trace successfully the evolution of any one of the learned professions would require the hand of a master, of one who, like Darwin, could combine the capacity for patient observation with philosophic vision. In the case of medicine the difficulties are enormously increased by the extraordinary development which belongs to the history of the present century. The rate of progress has been too rapid for us to appreciate, and we stand bewildered, and, as it were, in a state of intellectual giddiness, when we attempt to obtain a broad comprehensive view of the subject. In a safer "middle flight" it is my purpose to dwell on certain of the factors which have molded the profession in English-speaking lands beyond the narrow seas—of British Medicine in Greater Britain. Even for this lesser task (though my affiliations are wide and my sympathies deep) I recognize the limitations of my fitness, and am not unaware that in my ignorance I shall overlook much which might have rendered less sketchy a sketch necessarily imperfect.

Evolution advances by such slow and imperceptible degrees that to those who are part of it the finger of time scarcely seems to move. Even the great epochs are seldom apparent to the participators. During the last century neither the colonists nor the mother country appreciated the thrilling interest of the long-fought duel for the possession of this continent. The acts and scenes of the drama, to them detached, isolated and independent, now glide like dissolving views into each other, and in the vitascope of history we can see the true sequence of events. That we can meet here today, Britons on British soil in a French province, is one of the far off results of that struggle. This was but a prelude to the other great event of the eighteenth century, the revolt of the colonies and the founding of a second great English speaking nation—in the words of Bishop Berkeley's prophecy, "Time's noblest offspring."

Surely a unique spectacle that a century later descendants of the actors of these two great dramas should meet in an English city in New France. Here the American may forget Yorktown in Louisburg, the Englishman Bunker Hill in Quebec, and the Frenchman both Louisburg and Quebec in Chateauguay; while we Canadians, English and French, in a forgiving spirit, overlooking your unseemly quarrels, are only too happy to welcome you to our country, this land on which, and for which, you have so often fought. Once, and only once, before in the history of the world could such a gathering as this have taken place. Divided though the Greeks were, a Hellenic sentiment of extraordinary strength united them in certain assemblies and festivals. No great flight of imagination is required to picture a notable representation of our profession in the fifth century B. C. meeting in such a colonial town as Agrigentum under the presidency of Empedocles. Delegates from the mother cities, brilliant predecessors of Hippocrates of the stamp of Damocedes and Herodicus, delegates from the sister colonies of Syracuse and other Sicilian towns, from neighboring Italy, from far distant Massilia, and from still more distant Panticapæum and Istra. And in such an assemblage there would have been men capable of discussing problems of life and mind more brilliantly than in many subsequent periods, in proportion as the pre Hippocratic philosophers in things medical had thought more deeply than many of those who came after them.

We English are the modern Greeks, and we alone have colonized as they did, as free people. There have been other great colonial empires, Phœnician, Roman, Spanish, Dutch and French, but in civil liberty and in intellectual freedom Magna Græcia and Greater Britain stand alone. The parallel so often drawn between them is of particular interest with reference to the similarity between the Greek settlements in Sicily and the English plantations on the Atlantic coast. Indeed, Freeman says, "I can never think of America without something suggesting Sicily, or of Sicily without something suggesting America." I wish to use the parallel only to emphasize two points, one of difference and one of resemblance. The Greek colonist took Greece with him. Hellas had no geographical bounds. "Massilia and Olbia were cities of Hellas in as full a sense as Athens or Sparta." While the emigrant Britons changed their sky, not their character, in crossing the great sea, yet the home stayers had never the same feelings toward the plantations as the Greeks had toward the colonial cities of Magna Græcia. If, as has been shrewdly surmised, Professor Seely was Herodotus reincarnate, how grieved the spirit of the "Father of History" must have been to say of Englishmen, "Nor have we even now ceased to think of ourselves as simply a race inhabiting an island off the northern coast of the continent of Europe." The assumption of gracious superiority which, unless carefully cloaked, smacks just a little of our national arrogance, is apt to jar on sensitive colonial nerves. With the expansion of the empire, and the supplanting of a national by an imperial spirit, this will become impossible. That this sentiment never prevailed in Hellas, as it did later in the Roman empire, was due largely to the fact that in literature, in science, and in art the colonial cities of Greece early overshadowed the mother cities. It may be because the settlements of Greater Britian were things of slower growth, that it took several generations and several bitter trials to teach a lesson the Greeks never had to learn.

The Greek spirit was the leaven of the old world, the working of which no nationality could resist. Thrice it saved Western civilization, for it had the magic power of leading captivity captive, and making even captive conquerors the missionaries of culture. What modern medicine owes to it will appear later. "The love of science, the love of art, the love of freedom, vitally correlated to each other and brought into organic union" were the essential attributes of the Greek genius (Butcher). While we can not claim for the Anglo Saxon race all of these distinctions, it has in a high degree that one which in practical life is the most valuable, and which has been the most precious gift of the race to the world—the love of freedom.

> Of freedom in her regal seat
> Of England.

It would carry one too far afield to discuss the difference between the native Briton and his children scattered so widely up and down the earth. In Canada, South Africa, Australia and New Zealand, types of the Anglo Saxon race are developing which will differ as much from each other and from the English as the American does today from the original stock; but amid these differences can everywhere be seen those race qualities which have made us what we are—"courage, national integrity, steady good sense, and energy in work." At a future meeting of the Association, perhaps in Australia, a professional Sir Charles Dilke, with a firm grasp on the subject, may deal with the medical problems of Greater Britain in a manner worthy of the address in medicine. My task, as I mentioned at the outset, is much less ambitious.

THE INFLUENCE OF GREECE ON BRITAIN.

Could some one with full knowledge patiently analyse the characteristics of British medicine he would find certain national traits, sufficiently distinct for recognition. Three centuries can not do very much—and that period has only just passed since the revival of medicine in England—but the local

conditions of isolation, which have been singularly favorable to the development of special peculiarities in the national character, have not been without effect on the medical profession. I can not do more than touch upon a few features, not distinctive but illustrative—features which will be useful as indicating the sources of influence upon Greater Britain in the past, and which may, perhaps, be suggestive as to lines of progress in the future.

Above the fireplace in Sir Henry Acland's study are three paneled portraits of Linacre, Sydenham and Harvey; the scroll upon them reads *Literæ, Praxis, Scientia.* To this great triumvirate, as to the fountain heads, we may trace the streams of inspiration which have made British medicine what it is today.

Linacre, the type of the litery physician, must ever hold a unique place in the annals of our profession. To him was due in great measure the revival of Greek thought in the sixteenth century in England, and in the last Harveian Oration Dr. Payne has pointed out his importance as a forerunner of Harvey. He made Greek methods available; through him the art of Hippocrates and the science of Galen became once more the subject of careful, first-hand study. Linacre, as Dr. Payne remarks, "was possessed from his youth till his death by the enthusiasm of learning. He was an idealist, devoted to objects which the world thought of little use." Painstaking, accurate, critical, hypocritical, perhaps, he remains today the chief literary representative of British medicine. Neither in Britain nor in Greater Britain have we maintained the place in the world of letters created for us by Linacre's noble start. It is true that in no generation since has the profession lacked a man who might stand unabashed in the temple at Delos; but, judged by the fruits of learning, scholars of his type have been more common in France and Germany. Nor is it to our credit that so little provision is made for the encouragement of these studies. For years the reputation of Great Britain in this matter was sustained almost alone by the great Deeside scholar, the surgeon of Banchory, Francis Adams, the interpreter of Hippocrates to English students. In this century he and Greenhill have well maintained the traditions of Linacre. Their work, and that of a few of our contemporaries, among whom Ogle must be specially mentioned, has kept us in touch with the ancients. But by the neglect of the study of the humanities, which has been far too general, the profession loses a very precious quality.

While in critical scholarship and in accurate historical studies British medicine must take a second place, the influence of Linacre, exerted through the Royal College of Physicians and the old Universities, has given to the humanities an important part in education, so that they have molded a larger section of the profession than in any other country. A physician may possess the science of Harvey and the art of Sydenham, and yet there may be lacking in him those finer qualities of heart and head which count for so much in life. Pasture is not everything, and that indefinable, though well understood, something which we know as breeding is not always an accompaniment of great professional skill. Medicine is seen at its best in men whose faculties have had the highest and most harmonious culture. The Lathams, the Watsons, the Pagets, the Jenners and the Gairdners have influenced the profession less by their special work than by exemplifying those graces of life and refinements of heart which make up character. And the men of this stamp in Greater Britain have left the most enduring mark: Beaumont, Bovell, and Hodder in Toronto; Holmes, Campbell and Howard in this city; the Warrens, the Jacksons, the Bigelows, the Bowditches and the Shattucks in Boston; Bard, Hossack, Francis, Clark and Flint in New York; Morgan, Shippen, Redman, Rush, Coxe, the elder Wood, the elder Pepper, and the elder Mitchell in Philadelphia—Brahmins all, in the language of the greatest Brahmin among them, Oliver Wendell Holmes—these, and men like unto them, have been the leaven which has raised our profession above the dead level of a business.

The *literæ humaniores* represented by Linacre, revived Greek methods, but the faculty at the end of the sixteenth and the beginning of the seventeenth centuries was in a slough of ignorance and self-conceit, and not to be aroused even by Moses and the prophets in the form of Hippocrates and the fathers of medicine.

In the pictures referred to Sydenham is placed between Linacre and Harvey, but science preceded practice, and Harvey's great Lumleian Lectures were delivered before Sydenham was born. Linacre has been well called by Payne Harvey's intellectual grandfather. "The discovery of the circulation of the blood was the climax of that movement which began a century and a half before with the revival of Greek medical classics and especially of Galen" (Payne). Harvey returned to Greek methods and became the founder of modern experimental physiology and the great glory of British scientific medicine. The demonstration of the circulation of the blood remains in every detail a model research. I shall not repeat the oft-told tale of Harvey's great and enduring influence, but I must refer to one feature which, until lately, has been also a special characteristic of his direct successors in Great Britain. Harvey was a practitioner and hospital physician. There are gossiping statements by Aubrey to the effect that "he fell mightily in his practice" after the publication of the "De Motu Cordis," and that his "therapeutic way" was not admired; but to these his practical success is the best answer. It is remarkable that a large proportion of all the physiologic work of Great Britain has been done by men who have become successful hospital physicians and surgeons. I was much impressed by a conversation with Professor Ludwig in 1884. Speaking of the state of English physiology, he lamented the lapse of a favorite English pupil from science to practice; but he added, "while sorry for him, I am glad for the profession in England." He held that the clinical physicians of that country had received a very positive impress from the work of their early years in physiology and the natural sciences. I was surprised at the list of names which he cited—among them I remember Bowman, Paget, Savory and Lister. Ludwig attributed this feature in part to the independent character of the schools in England, to the absence of the university element, so important in medical life in Germany, but, above all, to the practical character of the English mind, the better men preferring an active life in practice to a secluded laboratory career.

Thucydides it was who said of the Greeks that they possessed "the power of thinking before they acted, and of acting too." The same is true in a high degree of the English race. To know first what has to be done, then to do it, comprises the whole philosophy of practical life. Sydenham (*Angliæ lumen*, as he has been well called) is the model practical physician of modern times. Linacre led Harvey back to Galen, Sydenham to Hippocrates. The one took Greek science, the other not so much Greek medicine as Greek methods, particularly intellectual fearlessness, and a certain knack of looking at things. Sydenham broke with authority and went to Nature. It is an extraordinary fact that he could have been so emancipated from dogmas and theories of all sorts. He laid down the fundamental proposition, and acted upon it, that "all diseases should be described as objects of natural history." To do him justice we must remember, as Dr. John Brown says, "in the midst of what a mass of errors and prejudices, of theories actively mischievous, he was placed, at a time when the mania of hypothesis was at its height, and when the practical part of his art was overrun and stultified by vile and silly nostrums."

Sydenham led us back to Hippocrates; I would that we could be led oftener to Sydenham. How necessary to bear in mind what he says about the method of the study of medicine. "In writing, therefore, such a natural history of diseases, every merely philosophical hypothesis should be set aside, and the manifest and natural phenomena, however minute, should be noted with the utmost exactness. The usefulness of this procedure can not be easily over-rated as compared with the subtle inquiries and trifling notions of modern writers, nor can there be a shorter, or indeed any other way of coming at the morbific causes, or of discovering the curative indications, than by a certain perception of the peculiar symptoms? By these steps and helps it was that the father of physic, the great Hippocrates, came to excel, his theory being no more than an exact description or view of Nature. He found that Nature alone terminates diseases, and works a cure with a few simple medicines, and often enough with no medicines at all." Well, indeed, has a recent writer remarked, "Sydenham is unlike every previous teacher of the principles and practice of medicine in the modern world."

Sydenham—not Linacre or Harvey—is the model British physician, in whom were concentrated all these practical instincts upon which we lay such stress in the Anglo-Saxon character. The Greek faculty which we possess of thinking and acting has enabled us, in spite of many disadvantages, to take the lion's share in the great practical advances in medicine. The three greatest scientific movements of the century have come from Germany and France. Bichat, Laennec and Louis laid the foundation of modern clinical medicine; Virchow and his pupils of scientific pathology; while Pasteur and Koch have revolutionized the study of the causes of disease; and yet the modern history of the art of medicine could almost be written in its fulness from the records of the Anglo Saxon race. We can claim almost every practical advance of the very first rank—vaccination, anesthesia, preventive medicine and

antiseptic surgery—the "captain jewels in the carcanet" of the profession, beside which can be placed no others of equal luster.

THE INFLUENCE OF AUTHORITY IN MEDICINE.

One other lesson of Sydenham's life needs careful conning. The English Hippocrates, as I said, broke with authority. His motto was:

> Thou, nature, art my goddess; to thy law
> My services are bound.

Undue reverence for authority as such, a serene satisfaction with the *status quo* and a fatuous objection to change, have often retarded the progress of medicine. In every generation, in every country there had been, and ever will be, *laudatores temporis acti*, in the bad sense of that phrase, not a few of them men in high places, who have lent the weight of a complacent conservatism to bolster up an ineffectual attempt to stay the progress of new ideas. Every innovator from Harvey to Lister has been made to feel its force. The recently issued life of Thomas Wakley is a running commentary on this spirit, against the pricks of which he kicked so hard and so effectually. But there are signs of a great change. The old universities and the colleges, once the chief offenders, have been emancipated, and remain no longer, as Gibbon found them, steeped in port and prejudice. The value of authority *per se* has lessened enormously, and we of Greater Britain have perhaps suffered as the pendulum has swung to the other extreme. Practice loves authority, as announced in "the general and perpetual voice of men" (Hooker). Science must ever hold with Epicharmus that a judicious distrust and a wise skepticism are the sinews of the understanding. And yet the very foundations of belief in almost everything relating to our art rest upon authority. The practitioner can not always be the judge, the responsibility must often rest with the teachers and investigators, who can only learn in the lessons of history the terrible significance of the word.

In the treatment of fever the fetters of a thousand years were shattered by Sydenham—shattered only to be riveted anew. How hard was the battle in this century against the intrenched and stubborn foe. Listen to the eloquent pleadings of Stokes, pleading, as did Sydenham, against authority, and against the bleedings, the purgings and sweatings of fifty years ago. "Though his hair be gray, and his authority high, he is but a child in knowledge and his reputation an error. On a level with the child, so far as correct appreciation of the great truths of medicine is concerned, he is very different in other respects; his powers of doing mischief are greater; he is far more dangerous. Oh! that men would stoop to learn, or at least cease to destroy." The potency of human authority among the "powers that be" was never better drawn than by the judicious Hooker in his section on this subject: "And this not only with the 'simpler sort,' but the learneder and wiser we are, the more such arguments in some cases prevail with us. The reason why the simpler sort are moved with authority is the conscience of their own ignorance; whereby it cometh to pass that having learned men in admiration, they rather fear to dislike them than know wherefore they should allow and follow their judgments. Contrariwise with them that are skilful, authority is much more strong and forcible; because they only are able to discern how just cause there is why to some men's authority so much should be attributed. For which cause the name of Hippocrates (no doubt) were more effectual to persuade such men as Galen himself than to move a silly empiric."[1]

Sydenham was called "a man of many doubts," and therein lay the secret of his great strength.

MEDICINE IN AMERICA: TO 1820.

Turning now to the main question of the development of this British medicine in Greater Britain, I must at once acknowledge the impossibility of doing justice to it. I can only indicate a few points of importance, and I must confine my remarks chiefly to the American part of Greater Britain.

We may recognize three periods, corresponding to three distinct waves of influence: the first from the early migrations to about 1820; the second from about 1820 to 1860; and the third from about 1860 to the present time.

The Colonial settlements were contemporaneous with the revival of medicine in England. Fellow-students of Harvey at Cambridge might have sailed in the *Mayflower* and the *Arbella*. The more carefully planned expeditions usually enlisted the services of a well trained physician, and the early records, particularly of the New England colonies, contain many interesting references to these college-bred men. Giles Firman, who settled in Boston in 1632, a Cambridge man, seems to have been the first to give instruction in medicine in the new world. The parsons of that day had often a smattering of physic, and illustrated what Cotton Mather called an "angelical conjunction." He says: "Ever since the days of Luke, the Evangelist, skill in physick has been frequently professed and practiced by persons whose more declared business was the study of divinity." Firman himself finding physic "but a meane helpe," took orders. These English physicians in the New England colonies were scholarly, able men. Roger Chillingworth, in Hawthorne's "Scarlet Letter," has depicted them in a sketch of his own life: "Made up of earnest, studious, thoughtful, quiet years, bestowed faithfully for the increase of knowledge; faithfully, too, for the advancement of human welfare; men thoughtful for others, caring little for themselves, kind, just, true, and of constant if not warm affections"—a singularly truthful picture of the old colonial physician.

Until the establishment of medical schools—University of Pennsylvania, 1763; King's College (afterward Columbia) 1767; and Harvard, 1782—the supply of physicians for the colonies came from Great Britain, supplemented by men trained under the old apprentice system, and of colonists who went to Edinburgh, Leyden and London for their medical education. This latter group had a most powerful effect in molding professional life in the pre-revolutionary period. They were men who had enjoyed not alone the instruction, but often the intimate friendship of the great English and European physicians. Morgan, Rush, Shippen, Bard, Wistar, Hossack and others had received an education comprising all that was best in the period, and had acquired the added culture which can only come from travel and wide acquaintance with the world. Morgan, the founder of the medical school of the University of Pennsylvania, was away seven years, and before returning had taken his seat as a corresponding member of the French Academy of Surgery, besides having been elected a Fellow of the Royal Society. The war of Independence interrupted temporarily the stream of students, but not the friendship which existed between Cullen and Fothergill and their old pupils in America. The correspondence of these two warm friends of the colonies testifies to the strong professional intimacy which existed at the time between the leaders of the profession in the old and new worlds. But neither Boerhaave, Cullen, nor Fothergill stamped colonial medicine as did the great Scotchman, John Hunter. Long weary centuries separated Harvey from Galen; not a century elapsed from the death of the great physiologist to the advent of the man in whose phenomenal personality may be seen all the distinctive traits of modern medicine, and the range of whose mighty intellect has had few, if any, equals since Aristotle. Hunter's influence on the profession of this continent, so deep and enduring, was exerted in three ways. In the first place, his career as an army surgeon, and his writings on subjects of special interest to military men, carried his work and ways into innumerable campaigns in the long French wars, and the war of Independence. Hunter's works were reprinted in America as early as 1791 and 1793. In the second place, Hunter had a number of most distinguished students from the colonies, among whom were two who became teachers of wide reputation. William Shippen, the first Professor of Anatomy in the University of Pennsylvania, lived with Hunter on terms of the greatest intimacy. He brought back his methods of teaching, and some measure of his spirit. With the exception of Hewson and Home, Hunter had no more distinguished pupil than Philip Syng Physick, who was his House Surgeon at St. George's Hospital, and his devoted friend. For more than a generation Physick had no surgical compeer in America, and enjoyed a reputation equaled by no one save Rush. He taught Hunterian methods in the largest medical school in the country, and the work of his nephew (Dorsey) on surgery is very largely Hunter modified by Physick. But in a third and much more potent way the great master influenced the profession of this continent. Hunter was a naturalist to whom pathologic processes were only a small part of a stupendous whole, governed by law, but which could never be understood until the facts had been accumulated, tabulated, and systematized. By his example, by his prodigious industry, and by his suggestive experiments he led men again into the old paths of Aristotle, Galen and Harvey. He made all thinking physicians naturalists; he lent a dignity to the study of organic life and re-established a close union between medicine and the natural sciences. Both in Britain and Greater Britain he laid the foundation of the great collections and museums, particularly those connected with the medical schools. The Wistar-Horner and the Warren Museums originated with men who had been greatly influenced by Hunter. He was, moreover, the intellectual father of that interesting group of men on this side of the Atlantic, who, while practicing as physicians, devoted much time and labor to the study of natural history. In the latter part of the last century and during the first thirty years of this, the successful practitioner was very often a naturalist.

I wish that time permitted me to do justice to the long list of men who have been devoted naturalists, and who have made contributions of great value. Benjamin Smith Barton, David Hossack, Jacob Bigelow, Richard Harland, John D. Godman, Samuel George Morton, John Collins Warren, Samuel L. Mitchell, J. Aiken Meigs and many others have left the records of their industry in their valuable works, and in the Transactions of the various societies and academies. In Canada many of our best naturalists have been physicians, and collections in this city testify to the industry of Holmes and McCullough. I was regretting the humanities a few minutes ago, and now I have to mourn the almost complete severance of medicine from the old natural history. To a man the most delightful recollections of whose studentship are the Saturdays spent with a preceptor who had a Hunterian appetite for specimens—anything from a trilobite to an acarus—to such a one across the present brilliant outlook comes the shadow of the thought that the conditions of progress will make impossible again such careers as those of William Kitchen Parker and William Carmichael McIntosh.

Until about 1820 the English profession of this continent knew little else than British medicine. After this date in the United States the ties of professional union with the old country became relaxed, owing in great part to the increase in the number of home schools, and in part to the development of an American literature. To 1820, 114 native medical books of all kinds had been issued from the press, and 131 reprints and translations, the former English, the latter almost exclusively French (Billings). Turning for a few minutes to the conditions of the profession in Canada during this period, I regret that I can not speak of the many interesting questions relating to the French colonies. I may mention, however, that with the earliest settlers physicians had come, and among the Jesuits, in their devoted missions, there are records of *donnés* (laymen attached to the service) who were members of the profession. One of these, René Goupil, suffered martyrdom at the hands of the Iroquois.[2]

Between the fall of Quebec in 1759 and 1820 the English population had been increased by the settlement of Upper Canada, chiefly by United Empire Loyalists from the United States, and after the war of 1812 by settlers from the old country. The physicians in the sparsely settled districts were either young men who sought their fortunes in the new colony or were army surgeons who had remained after the Revolutionary war or the war of 1812. The military element gave for some years a very distinctive stamp to the profession. These surgeons were men of energy and ability, who had seen much service and were accustomed to order, discipline and regulations. Sabine, in his "History of the Loyalists," refers to the Tory proclivities of the doctors, and says that they were not so much disturbed as the lawyers and clergymen. Still a good many of them left their homes "for conscience sake"; and Canniff, in his "History of the Profession in Upper Canada," gives a list of those known to have been among the United Empire Loyalists. The character of the men who controlled the profession of the new colony is well shown by the proceedings of the Medical Board, which was organized in 1819. Drs. Macaulay and Widmer, both army surgeons, were the chief members. The latter, who has well been termed the father of the profession in Upper Canada, a man of the very highest character did more than any one else to promote the progress of the profession, and throughout his long career his efforts were always directed to the proper channels. In looking through Canniff's most valuable work one is much impressed by the sterling worth and mettle of the old army surgeons, who in these early days formed the larger part of the profession. The minutes of the Medical Board indicate with what military discipline the candidates were examined, and the percentage of rejections has probably never been higher in the history of the province than it was in the first twenty years of the existence of the Board.

One picture on the canvas of those early days lingers in the memory, illustrating many of the most attractive features of a race which has done much to make this country what it is today. Widmer was the type of the dignified old army surgeon, scrupulously punctilious, and in every detail regardful of the proprieties of life. "Tiger" Dunlop may be taken as the very incarnation of that restless, roving spirit which has driven the Scotch broadcast upon the world. After fighting with the Connaught Rangers in the war of 1812, campaigning in India, clearing the Sangur of tigers—hence his sobriquet "Tiger"—lecturing on medical jurisprudence in Edinburgh, writing for *Blackwood*, editing the *British Press* and the *Telescope*, introducing *Beck's Medical Jurisprudence* to English readers, and figuring as director and promoter of various companies, this extraordinary character appears in the young colony as "Warden of the Black Forest" in the employ of the Canada Company. His life in the backwoods at Gairbraid, his "Noctes Ambrosianæ Canadenses," his famous "Twelve Apostles," as he called his mahogany liquor stand (each bottle a full quart), his active political life, his remarkable household, his many eccentricities—are they not all portrayed to the life in the recently issued "In the Days of the Canada Company"?

AMERICA: 1820–1860.

Turning now to the second period, we may remark in passing that the nineteenth century did not open very auspiciously for British medicine. Hunter had left no successor, and, powerful as had been his influence, it was too weak to stem the tide of abstract speculation with which Cullen, Brown and others flooded the profession. No more sterile period exists than the early decades of this century. Willan, a great naturalist in skin diseases, with a few others, save it from utter oblivion. The methods of Hippocrates, of Sydenham and of Hunter had not yet been made available in every day work. The awakening came in France, and such an awakening! It can be compared with nothing but the renaissance in the sixteenth and seventeenth centuries, which gave us Vesalius and Harvey. "Citizen" Bichât and Broussais led the way, but Laennec really created clinical medicine as we know it today. The discovery of auscultation was only an accident—of vast moment it is true—in a systematic study of the correlation of symptoms with anatomic changes. Louis, Andral and Chomel extended the reputation of the French school, which was maintained to the full until the sixth decade, when the brilliant Trousseau ended a long line of Paris teachers, whose audience had been world wide.

The revival of medicine in Great Britain was directly due to the French. Bright and Addison, Graves and Stokes, Forbes and Marshall Hall, Latham and Bennett were profoundly affected by the new movement. In the United States, Anglican influence did not wane until after 1820. Translations of the works of Bichât appeared as early as 1802, and there were reprints in subsequent years, but it was not until 1823 that the first translation of Laennec—a reprint of Forbes's edition—was issued. Broussais's works became very popular in translations after 1830, and in the journals from this time on the change of allegiance became very evident. But men rather than books diverted the trend of professional thought.

After 1825 American students no longer went to Edinburgh and London, but to Paris, and one can say that between 1830 and 1860 every teacher and writer of note passed under the Gallic yoke. The translations of Louis's works, and the extraordinary success of his American pupils—a band of the ablest young men the country has ever seen—added force to the movement. And yet this was a period in which American medical literature was made up largely of pirated English books, and the Systems, Encyclopedias, and Libraries, chiefly reprints, testify to the zeal of the publishers. Stokes, Graves, Watson, Todd, Bennett and Williams furnished Anglican pap to the sucklings, as well as strong meat to the full grown. In spite of the powerful French influence the textbooks of the schools were almost exclusively English.

In Canada the period from 1820 to 1860 saw the establishment of the English universities and medical schools. In Montreal the agencies at work were wholly Scotch. The McGill Medical School was organized by Scotchmen, and from its inception has followed closely Edinburgh methods. The Paris influence, less personal, was exerted chiefly through English and Scotch channels. The Upper Canada schools were organized by men with English affiliations and the traditions of Guy's, St. Bartholomew's, St. Thomas's, St. George's, and of the London Hospital rather than those of Edinburgh, have prevailed in Toronto and Kingston.

The local French influence in British medicine in Canada has been very slight. In the early decades of the century, when the cities were smaller and the intercourse between the French and English somewhat closer, the reciprocal action was more marked. At that period English methods became somewhat the vogue among the French; several very prominent French Canadians were Edinburgh graduates. Attempts were made in the medical journals to have communications in both languages, but the fusion of the two sections of the profession was no more feasible than the fusion of the two nationalities, and the development has progressed along separate lines.

AMERICA: 1860–1897.

The third period dates from about 1860, when the influence of German medicine began to be felt. The rise of the Vienna school was for a long time the only visible result in Germany of the French renaissance. Skoda, the German Laennec, and Rokitansky, the German Morgagni, influenced English and

American thought between 1840 and 1860, but it was not until after the last date that Teutonic medicine began to be felt as a vitalizing power, chiefly through the energy of Virchow. After the translation of the "Cellular Pathology" by Chance (1860) the way lay clear and open to every young student who desired inspiration. There had been great men in Berlin before Virchow, but he made the town on the Spree a Mecca for the faithful of all lands. From this period we can date the rise of German influence in the profession of this continent. It came partly through the study of pathologic histology under the stimulus given by Virchow, and partly through the development of the specialties, particularly diseases of the eye, of the skin, and of the larynx. The singularly attractive courses of Hebra, the organization on a large scale in Vienna of a system of graduate teaching, designed especially for foreigners, the remarkable expansion of the German laboratories, combined to divert the stream of students from France. The change of allegiance was a deserved tribute to the splendid organization of the German Universities, to the untiring zeal and energy of their professors, and to their single-minded devotion to science for its own sake.

MEDICINE IN AUSTRALASIA.

In certain aspects the Australasian settlements present the most interesting problems of Greater Britain. More homogeneous, thoroughly British, isolated, distant, they must work out their destiny with a less stringent environment than, for example, surrounds the English in Canada. The traditions are more uniform, and, of whatever character, have filtered through British channels. The professional population of native trained men is as yet small, and the proportion of graduates and licentiates from the English, Scotch and Irish Colleges and Boards guarantees the dominance of old country ideas. What the maturity will show can not be predicted, but the vigorous infancy is full of "crescent promise." On looking over the files of Australian and New Zealand journals one is impressed with the monotonous similarity of the diseases in the Antipodes to those of Great Britain and of this continent. Except in the matter of parasitic affections and snake bites, the nosology presents few distinctive qualities. The proceedings of the four Intercolonial Congresses indicate a high level of professional thought. In two points Australia has not progressed as other parts of Greater Britain. The satisfactory regulation of practice, so early settled in Canada, has been beset with many difficulties. Both in the United States and in Australia the absence of the military element, which was so strong in Canada, may, in part at least, account for the great difference which has prevailed in this matter of the State license. The other relates to the question of ethics, to which one really does not care to refer, were it not absolutely forced upon the attention in reading the journals. Elsewhere professional squabbles, always so unseemly and distressing, are happily becoming very rare, and in Great Britain and on this side of the water we try at any rate to wash our dirty linen at home. In the large Australian cities differences and dissensions seem lamentably common. Surely they must be fermented by the atrocious system of election to the hospitals, which plunges the entire profession every third or fourth year into the throes of a contest in which the candidates have to solicit the suffrages of from 2,000 to 4,000 voters. Well indeed might Dr. Batchelor, in his address to the Fourth Intercolonial Congress, say: "It is a scandal that in any British community, much less in a community which takes pride in a progressive spirit, such a pernicious system should survive for an hour."

MEDICINE IN HINDUSTAN.

Of India, of "Vishnu-land," what can one say in a few minutes? Three thoughts at once claim recognition. Here, in the dim dawn of history, with the great Aryan people, was the intellectual cradle of the world. To the Hindus we owe a debt which we can at any rate acknowledge, and even in medicine many of our traditions and practices may be traced to them, as as may be gathered from that most interesting "History of Aryan Medical Science," by the Thakore Sahib of Gondal.

Then there arises the memory of the men who have done so much for British medicine in this great empire. Far from their homes, far from congenial surroundings, and far from the stimulus of scientific influences, Annesley and Ballingall, Twining, Morehead, Waring, Parkes, Cunningham, Lewis, Vandyke Carter and many others have nobly upheld the traditions of Harvey and of Sydenham. On the great epidemic diseases how impoverished would our literature be in the absence of their contributions! But then there comes the thought of "the little done, the undone vast," when one considers the remarkable opportunities for study which India has presented. Where else in the world is there such a field for observation in cholera, leprosy, dysentery, the plague, typhoid fever, malaria, and in a host of other less important maladies? And what has the British Goverment done toward the scientific investigation of the diseases of India? Until recently little or nothing, and the proposal to found an institute for the scientific study of disease has actually come from the native chiefs. The work of Dr. Hankin and of Professor Haffkine, and the not unmixed evil of the brisk epidemic of plague in Bombay, may arouse the officials to a consciousness of their shortcomings. While sanitary progress has been great, as shown in a reduction of the mortality from 69 per mille before 1857 to 15 per mille at present, many problems are still urgent, as may be gathered from Dr. Harvey's Presidential Address in the Proceedings of the Indian Medical Congress. That typhoid fever can be called the "scourge of India," and that the incidence of the disease should remain so high among the troops, points to serious sanitary defects as yet unremedied. As to the prevalence of venereal disease among the soldiers, an admission of nearly 500 per mille tells its own tale. On reading the journals and discussions one gets the impression that things are not as they should be in India. There seems to be an absence of proper standards of authority. Had there been in each Presidency during the past twenty years well-equipped Government laboratories in charge of able men, well trained in modern methods, the contributions to our knowledge of epidemic diseases might have been epoch making, and, at any rate, we should have been spared the crudeness which is evident in some of the work (particularly in that upon malaria) of zealous but badly trained men.

THE FUTURE OF MEDICINE IN GREATER BRITAIN.

In estimating the progress of medicine in the countries comprising Greater Britain, the future rather than the present should be in our minds. The strides which have been taken during the past twenty years are a strong warrant that we have entered upon a period of exceptional development. When I see what has been accomplished in this city in the short space of time since I left I can scarcely credit my eyes. The reality exceeds the utmost desires of my dreams. The awakening of the profession in the United States to a consciousness of their responsibilities and opportunities has caused unparalleled changes, which have given an impetus to medical work which has already borne a rich harvest. Within two hundred years who can say where the intellectual center of the Anglo-Saxon race will be? The mother country herself has only become an intellectual nation of the first rank within a period altogether too short to justify a prediction that she has reached the zenith. She will probably reverse the history of Hellos, in which the mental superiority was at first with the colonies. At the end of the next century ardent old-world students may come to this side, "as o'er a brook," seeking inspiration from great masters, perhaps in this very city; or the current may turn toward the schools of the great nations of the South. Under new and previously unkown conditions the Africander, the Australian, or the New Zealander may reach a development before which even the "glory that was Greece" may pale. Visionary as this may appear, it is not one whit more improbable today than would have been a prophecy made in 1797 that such a gathering as the present would be possible within a century on the banks of the St. Lawrence.

Meanwhile to the throbbing vitality of modern medicine the two great meetings held this month, in lands so widely distant, bear eloquent testimony. Free, cosmopolitan, no longer hampered by the dogmas of schools, we may feel a just pride in a profession almost totally emancipated from the bondage of error and prejudice. Distinction of race, nationality, color and creed are unknown within the portals of the temple of Æsculapius. Dare we dream that this harmony and cohesion so rapidly developing in medicine, obliterating the strongest lines of division, knowing no tie of loyalty but loyalty to truth—dare we hope, I say, that in the wider range of human affairs a similar solidarity might ultimately be reached? Who can say that the forges of Time will weld no links between man and man stronger than those of religion or of country? Some son of Beor, touched with a prophetic vision, piercing the clouds which now veil the eternal sunshine of the mountain top; some spectator of all time and all existence (to use Plato's expression) might see in this gathering of men of one blood and one tongue a gleam of hope for the future, of hope, at any rate, that the great race, so dominant on the earth today, may progress in the bonds of peace—a faint glimmer, perhaps, of the larger hope of humanity of the day when "the common sense of most shall hold a fretful world in awe."

But these, I fear, are the dreams of the closest student who knows not the world nor its ways. There remains for us, Greater Britons, of whatsoever land, the bounden duty to cherish the best traditions of our fathers, and particularly of the men who gave to British medicine its most distinctive features; of the men, too, who found for us the light and liberty of Greek thought—Linacre, Harvey and Sydenham—those "ancient founts of inspiration," and models for all time in literature, science and practice.

REFERENCES.

1 Ecclesiastical Polity, Book ii, vii, 2.
2 Parkman: Jesuits in North America.

ORIGINAL ARTICLES.

SOME DEFORMITIES OF THE CHEST IN THE LIGHT OF ITS ANCESTRY AND GROWTH.

Presented in the Section on Practice of Medicine at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, Pa., June 1–4, 1897.

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I can invite your attention to only a limited portion of the most interesting field of deformities of the chest; and even here my presentation can not claim to be exhaustive, but simply suggestive of certain lines for future work and discussion. The deformities I have chosen are the common and important ones of (so-called) flat chest, "pigeon-breast," "guttered" sternum, Harrison's groove and "funnel chest" ("Trichter Brust"). These may be, at first sight, divided into two apparently distinct classes, those in which the transverse diameter is increased at the expense of the anteroposterior, which for the sake of brevity in our future discussion we will call the transverse or "bellows" form of chest, and those in which the increase appears to be the antero-posterior diameter and the contraction in the transverse, which again, for the sake of brevity, we will call the antero-posterior or "keeled" type of chest. It is also obvious that these increases and diminutions of the diameters are relative rather than absolute, and that when we say that a chest is flattened, what we mean is not so much that its anteroposterior diameter is absolutely diminished, as that this is short in comparison with or relative to the transverse diameter, and *vice versa* in regard to the anteroposterior chest. In fact, the deformities of the chest would appear to depend upon a flattening or compression in the anteroposterior diameter and bulging in the transverse, or *vice versa*. In the transverse or "bellows" class of chests, we would place the innumerable varieties of flat chest, hollow chest as it is often termed, and the singular funnel chest; while under the anteroposterior type would be placed the pigeon breast and guttered, or grooved, sternum. It would also appear that these two divisions corresponded fairly accurately to the two great types of chest among the mammalia. The one, the typical quadrupedal chest—as found in the carnivora, the ungulates, and the great majority of the families of this class—has an anteroposterior diameter which is distinctly in excess of the transverse, so that a transverse section of the chest cavity would form an oval or heart-shaped figure with its long diameter perpendicular to the anterior wall (sagittal). This form of chest is obviously necessitated by and correlated with the backward and forward swing of the anterior limbs in the movements of locomotion. Maximum depth with a minimum width, so far as this may be consistent with abundance of room for the heart and great vessels, is the *desideratum*. This type of chest has passed into popular literature as the well-known "deep" chest of the hound or the race horse; and it is very curious to note to what an extent, by a process of transference, terms which are descriptive of this form of chest have been applied to the human torso, where we shall see they are anything but appropriate. The other type of chest is that in which the transverse diameter equals or exceeds the anteroposterior, and is found almost solely in two widely separate families, the numerous but aberrant order of bats, and the higher primates, the anthropoid apes and man. So striking was this departure from the commonest type that the bats were actually placed in close relation to man, in the old Linnean system. Here again, however, a mechanical explanation would appear to be adequate to account for the form. The two families have absolutely nothing in common, save the fact that the anterior limbs are no longer used for supporting the body during ground locomotion, in the bats being used for flight, and in the anthropoid and human species for swinging through the branches. Thus there is no longer a necessity for a limited backward and forward movement of the limbs in parallel lines, so that the "keel" or boat-shaped form of chest is no longer a necessity, and the great sheet of the pectoral muscles, using the wing in the one case and the hand with the branch it has seized, in the other, as its fixed point, is continually pulling the prominent sternum back toward the vertebral column. The ribs yield at their angle and we have the anteroposterior chest gradually transforming itself into the tranverse form. The bird, it may be said in passing, solves the problem in a somewhat different way by the development of his enormous keel or crest on the sternum, the actual chest wall itself remaining, however, in very much the same shape, with only a slight preponderance of the anteroposterior over the transverse diameter. After the upright position has been attained this modification goes still further. The arms hang by the sides instead of being permanently extended in a forward or dorsiventral direction. The shoulder-girdle, with its great mass of muscles and attached limbs, sinks downward from its former position and begins to press more or less firmly upon the lateral aspects of the chest wall, and the first joint of the limb lies parallel and in contact with almost the entire lateral border of the chest. As a result the lateral expansion of the wings of the chest, which is the chief factor in quadrupedal respiration, as can be shown in the heaving flanks of the race horse or of the hound after the chase, this lateral expansion is interfered with by the pressure and the presence of a joint of the limb in this situation; and the anterior aspect of the chest, having been completely freed from the former splint-like action of the limbs, begins to become the most freely movable part of the wall, and we have the rising and falling or anteroposterior type of respiration to a large extent substituted for the lateral or wing-like type. To afford still greater freedom for this the girdle and its scapulæ recede still further toward the vertebral column until they come, ultimately, to lie almost directly on the flattened posterior wall of the chest. In fact, the chest comes to act like a pair of bellows, of which the vertebral wall is the fixed and the sternal wall the movable flap. I am convinced that one of the most important factors in the proper

respiratory development and capacity of the human chest is the extent to which the scapulæ come to lie upon the posterior wall or fixed flap of the bellows.

But I think I hear some one say, "what has all this purely morphologic process to do with us as physicians? Even if it be granted that the human chest, in the course of its development from an earlier quadrupedal form, has passed through these various stages from the keeled to the bellows type, what has this to do with our study of the human chest in the nineteenth century?" Much in every way, and I hope to be able to prove in regard to the deformities mentioned, everything in fact, for the reason that not merely do the probabilities point strongly to our human chest having passed through such stages ancestrally, but every individual chest passes through a number of these stages under our very eyes. In the embryo at the fourth month we have a chest which is almost identical in type with that of the quadruped—the dog, for instance, in which the anteroposterior diameter is as three to two, although it seldom reaches this figure in the embryo. Morris simply gives it as "greater." Macallister says, "the chest is deeper sagitally than transversely." At birth the diameters have come up to the proportion of the lower apes, in which they are almost equal, while from this period up to the twelfth or thirteenth year and to the twenty-fifth even, there is a gradual, steady modification of the chest shape until the full adult "bellows" form is reached, in which the diameters are exactly reversed, viz., as two to three in favor of the transverse. Although, according to Rotch, the proportion is as high as 1 to 2.5 or 3 (D. Powell). Though these changes in proportions are matters of common knowledge and are given in most of our anatomic works, I have been unable to find the exact records upon which the statements are based, and it had been my intention to have included in this paper at least fifteen or twenty measurements of chest diameters at each age at various periods from birth to maturity, but in this undertaking I was unfortunately thwarted and am able to give only the few following measurements and diagrams based upon them, which I think may be taken as fairly typical.

As will be seen by these measurements there is a steady progressive modification of the nearly circular or barrel-shaped chest at birth, up to the transversely oval-shaped chest of adult life. And now the question arises, is this transformation always complete? In my personal opinion it is not, by any means; and I claim that by the arrest of this progress at some particular stage, and exaggeration by the processes of respiration of the proportions which are normal at this particular time, the majority of the special deformities of the chest to which I have alluded are produced. Let us take, first of all, the condition of "pigeon breast." None of the authorities or theories attempt to shed any light on the crucial question of the whole situation, viz., why a chest which is normally widest in its transverse diameter should suddenly begin to flatten in this diameter and increase in the opposite one. When, however, we look at the question in the light of this change of shape which is taking place, then we can at once see that pigeon breast is simply persistence or a mechanical exaggeration of the normal ancestral and fetal anteroposterior or "keeled" chest. This change or deformity usually begins during the first six to eighteen months of infant life, when the chest is, in the normal child, of nearly equal diameters, and hence capable of elongating with equal ease in either one of them if pressure is brought to bear on it in that direction. In some cases, however, it begins later, when the chest has begun to assume more nearly its adult form, and in this case we have not only a mechanical cause to consider, but also the question whether we have not what might be termed a line of least resistance, which is here, as everywhere, in the direction of the ancestral type. But supposing we have, as is usually the case, a chest whose diameters are nearly equal, or even with the transverse slightly in excess (although it must be remembered that in children who are subjects of pigeon breast there is usually a general backwardness of development in the formation of the skeleton, and it is not improbable that in many cases we have actually a persistence of fetal type after birth, so that the anteroposterior diameter is excessive to begin with), what influence is there which will cause the drawing together of the lateral walls and the forward protrusion of the sternum? In the first place a small amount of influence in this regard may be exercised by the so-called accessory muscles of respiration, the sternal group, all of which tend to pull the sternum upward and slightly forward. But the influence of these is comparatively slight in normal respiration, and would probably be more than overbalanced by the opposite tendency on the part of the intercostal, which are weaker and thinner toward the sternal end of the interspaces, and lacking over the region of the sternum. In fact, there is only one factor which we believe is adequate to account for this singular distortion, and that is the great muscle sheet of the diaphragm. I shall not weary you with anatomico-mechanical descriptions of the origin, insertion and methods of action of this muscle, further than simply to remind you that it is a great fan-shaped sheet which, in respiration, curves up over the roof of the abdominal cavity in a high vaulted dome, which dome, by the contraction particularly of the great crura, is sharply flattened and pulled down, and also flattened from side to side by the lateral fibers; the vertebral column and the inner surface of the lower ribs, acting respectively as fixed points in this descent. That the diaphragm is chiefly concerned in the production of this deformity is admitted by all, and a variety of explanations have been offered to account for its excessive and extraordinary action, chiefly in the direction of obstructions to the entrance of air into the chest in the form of enlarged tonsils, adenoids in the pharynx or obstructions in the nasal passages. The real interference with its action is, however, at the other end of the scale, and comes not from above but below. Normally the diaphragm uses the ribs and vertebral column as its fixed point and pulls down the arch of its center, but when the vault of this center is firmly supported and fixed by a mass of abdominal contents, distended by gas, engorged by portal blood or packed with a mass of enlarged lymphatics, then the action of the muscle is reversed as to its lateral wings and the center becomes the fixed point and the ribs the point acted on. In other words, given a swollen, edematous, abdominal mass and you have the diaphragm at every respiration pulling the lateral chest walls inward and upward, instead of using them as a fixed point to pull its center downward and forward; and this swollen abdomen, which in its extreme form gives rise to the familiar "pot-belly" of poorly nourished children, is precisely the condition of affairs

which we find in the majority of cases of pigeon breast. This pressure is exercised almost solely in the transverse direction for the reason that between the vaulted center and the sternum there are no muscular fibers, but only the central tendon, while the muscular masses running from the central to the vertebral column slope downward so rapidly as to cause a protrusion of the abdomen instead of a sinking of the sternum. This explanation will also account for the frequent association of this condition with struma and rickets, in both of which this swollen and distended condition of the abdomen is extremely apt to occur, while in the latter there is also an abnormal softness of the bones to render them still more liable to distortion.

Now, will this relation of affairs account for any other of these conditions? For instance, the well known but not so common "hour-glass chest" with its Harrison's groove, as it is termed. At first sight it would not appear to do so, for the situation of the groove is somewhat peculiar, not at the level of the costal attachment of the diaphragm, but about two interspaces above, in fact, from one to two interspaces below the nipple. First of all, however, let us observe that this groove or constriction is not so much a diminution of the diameter of the chest above this point, as it is a line at which the chest wall suddenly begins to flare outward, and that we are really dealing with a chest of fairly uniform caliber down to this point, but of a sudden and marked widening beyond it. In a few cases, however, the constriction is not merely relative, but absolute as well. As I said, the situation of the groove at first view does not appear to fit in with our theory; but if we will examine a little more closely just what the direction of the tension of the normal diaphragm is, we shall be able to give at least a plausible explanation of how it is produced. The pull of the diaphragm on the lower ribs, when its center is fixed, is not directly inward but inward and upward. Now, what will be the result of traction in these directions acting on a yielding and movable framework like the walls of the chest? Obviously, that the lower ribs having but little or distant attachment to the sternum, would be glided upward and inward *en masse*, until they meet the resistance of the more firmly attached sternal or true ribs above them. When this takes place their further progress will be abruptly stopped, and the pull still continuing, they will, as it were, rotate round this fixed point of the sixth or seventh interspace as upon an axis and, instead of sliding upward and inward, begin to flare upward and outward. Consequently, we would expect to find Harrison's groove occurring in children in whom this marked abdomal distension did not develop until after some degree of rigidity and some approach to the adult form had begun to be attained by the chest, and this will be found to fit with the clinical facts of the case. When once the "flare" has begun it will be exaggerated both by the pressure of the distended abdomen below and also by the tension of the intercostals, and to some extent by the lower fibers of the pectorals and serrati above.

In that rare and extraordinary condition known as "funnel-chest," we have a condition in which the lower end of the sternum in general, and the base of the ensiform in particular, forms the bottom of a deep funnel-shaped depression around which the thoracic walls bulge out above and the abdominal walls below. This is a much more complicated state of affairs, and in the light of our present knowledge difficult of explanation; but we believe that the principal factor will be found to be a firm attachment, by tendinous bands, of this portion of the sternum which is accordingly prevented from yielding in the anteroposterior direction, while the walls of the chest above it and at the sides are bulging forward under the tremendous lateral pressure of the wings of the diaphragm. In other words, I believe it to be, if we may use the expression, a pigeon breast in which the lower end of the sternum has been firmly bound down and prevented from yielding in harmony with the rest of the chest wall. The same explanation will also apply, and much more obviously, to the condition of "guttered" sternum. Here we have a chest which upon measurement will be found to be distinctly above the normal in its anteroposterior diameter, but in which the greatest projection is not in the median line, but in a line drawn parallel with it upon each side about two inches from it. When we come to examine what that line represents, we find that it corresponds to the sternal end of the costal cartilages, and is paralleled by a groove corresponding to the costal ends, the weakest and most yielding point in the entire chest wall of the child; and we have here simply a pigeon-breast in which sufficient tension is exercised by this central tendon of the diaphragm upon the lower end of the sternum to prevent that bone from moving forward freely *en masse*, and consequently the lateral tension of the diaphragm is expanded upon the line of least resistance, which happens to be a double one, and corresponds to the sternal end of the costal cartilages. The curious one-sided bulgings of this description may also be explained in the same way, on the ground that the nutrition of the costal cartilages on the one side was inferior to that of the other. Again the importance of rickets as a producing cause of this disease is self-evident.

So far we have been considering exaggerations of the ancestral chest form, and now we come to those really much more common developments which are implied by the terms flat-chest, hollow-chest, etc., where we are confronted by the adult or human type. I have long been skeptical as to the actual existence of this particular type of deformity, and I regret that I have been unable to make anything like an adequate series of measurements to justify it. But the more carefully one inspects chests of this class, the more one is struck with the extent to which this flattening is apparent and not real. In the first place, even in popular terminology "flat-chestedness" is almost invariably associated with "round" shoulders. In other words, the flattening of the anterior aspect of the chest is in very large measure due to the forward movement and carrying of the great muscular masses of the shoulder girdles. Our standard of flatness or fulness of chest is simply a line drawn across it from one acromion process to the other, and it is obvious that we may have a distinct flattening of this line with a decided round chest, provided that the shoulders have slid forward far enough. As is already suggested in the term round-shouldered, even a mere glance at the hollow chest will show us that a very large proportion of this anterior flattening is due to the gliding forward of the scapulæ and their attachments so that the posterior outline of the upper part of the chest wall, instead of being almost a straight line as it should in the ideal position, is a very decided curve. And upon the application of accurate methods of measurements we find ourselves con-

fronted by the surprising situation that our so-called flat chest is really, if anything, slightly above the normal in its anteroposterior diameter, as is shown by the following all too scanty and desultory figures:

How is this extraordinary optical illlusion brought about? Not only is there no inconsistency between the facts, but one is necessarily a consequence of the other. My attention was first called to this relation in examining the chests of some school children who were undergoing special gymnastic exercise for the purpose of overcoming round-shoulderedness. The appearance of the youngsters was characteristic; the chest was flat, the back and shoulders bowed or rounded, the arms swinging slightly in front of the median line in a characteristically anthropoid position. Upon taking hold of the children by the shoulders from behind, and gently but firmly pulling the shoulders backward, while the spine was supported by the knee, it was found that an apparently normal shape of chest could be produced; but the difficulty was that the shoulders would not stay in this position, and a little further experimentation and some measurements revealed that the chest was so nearly round that the scapulæ had no flat posterior surface to rest upon, but were continually sliding forward upon the barrel-like outline of the outer surface of the ribs. This tendency was assisted by the somewhat slouching or anthropoid attitude which boys are apt to assume, and by the contraction of the great pectoral muscles. So marked was this latter fact that, in the language of their gymnasium teacher, they were said to be "muscle-bound," and I found upon inquiry that the trainer was quite familiar with this condition of affairs, and recognized it as a frequent factor in the production of this type of chest and shoulder. In short, the round chest, from the very insecurity of the position which it affords to the inner aspect of the scapulæ, tends to become, under the influence of gravitation and dominant muscle action, the apparently flat chest. In the case of children it is an amusing coincidence that when I asked the trainer what forms of exercise were found to be most useful in correcting this defect, I was immediately told that all sorts of climbing exercises, especially those which were done with the back toward the ladder, rope or framework which was being climbed were most useful. In other words, by a reversion to the arboreal habits of our ancestors who had this form of chest, its progress into the higher form can be expedited. I am not prepared to say that all forms of flat chest will be found to be of this variety, but neither, on the other hand, would I be willing to admit the existence of a flat chest in which the anteroposterior diameter was actually below the normal proportion to the transverse, until more accurate measurements than I have been able to find have been made. There may be and probably are absolutely as well as apparently flat chests, but no measurements which I have been able to discover have proved that fact yet.

Here the objection may very fairly be raised to this view of the matter, why, if these various forms of chests are either reversions to or the exaggerations of the form which prevailed in our healthy, vigorous animal ancestors, should they be associated with lack of vigor, malnutrition and ineffectiveness in the human species? I will conclude by briefly answering this objection. First of all, here as elsewhere, a reversion to a type which was perfectly normal and healthful in some of our ancestral stages may prove to be anything but that under the changed circumstances, as, for instance, the uric acid reversion in gout and lithemia, the molluscan reversion in calcareous, and the sponge reversion in fibroid degeneration. In fact, by the substitution of an anteroposterior bellows-action in the human chest, by the changed position of the shoulder masses and their appendages, the flat chest has become the type of vigor. A moment's consideration will show the reason of this. Placing a bellows in a parallel position, or in the same relative position as the walls of the human chest, with its fixed side held posteriorly and its nozzle upward, it is easy to see that the possible distension of that chest depends upon the range in an upward and forward direction permitted to the anterior flap. Now, supposing that this anterior flap has to be lifted not from a force acting from below as in the case of the hand, but by a force which radiates toward the nozzle of the bellows, it will then be obvious that the further the anterior flap of the bellows is lifted away from the posterior, the less will be the range which it can be caused to travel; or the same point may be illustrated by the bellows itself, when we have the range limited by the leather flaps, the further the free handle is lifted from the fixed, and the shorter the distance which it is capable of traveling. The same thing may be more clearly seen by studying the positions of the ribs and their movements. The ribs slant downward and forward in their natural position, and the capacity of the chest is increased by lifting them up into a horizontal position. It being impossible for them to pass the horizontal position on account of the shoulder-girdle, it is obvious that the more nearly they are forced into this position in rest, the smaller the range through which they are capable of traveling; so the pigeon-breast of rickets, and the barrel-chest of emphysema, are alike rigid chests with very small power of changing their respiratory capacity. This condition is strikingly illustrated in some cases of hunchback in which the chest wall becomes pushed upward and forward into an almost horizontal plane, as was the condition in a case which I examined during the past winter. The result was that the ribs being permanently fixed in the condition of full respiration the chest could be neither enlarged nor diminished by the chest muscles, and the breathing was almost solely abdominal. This rigidity of the chest as the concomitant of pulmonary tuberculosis was long ago pointed out by that acute and brilliant clinician, Fothergill; and the few measurements which I am able to append show with singular uniformity that this rigid chest is also a distinctly quadrupedal or keeled one.

And now for the brief series of measurements that I have as yet been able to make, for valued assistance in the collection of which I am indebted to Drs. N. G. Russell and H. G Matzinger and also to the latter for the diagrams.

My first series was a short one, of patients and members of staff at the Buffalo General Hospital. My second another from the Military Hospital (patients and assistants) at Fort Porter. Last and most valuable a series of fifty soldiers from the garrison at Fort Porter for which as well as the permission for the former, I am indebted to the kindness of Major A. H. Appel, who also appended the ages, weight and height of the men. The results may be thus summarized:

NORMAL CHEST MEASUREMENT. INCHES.
ENLISTED MEN. FORT PORTER.

Number.	Age.	Weight.	Inches Height.	Extramammillary length.	Mid-superior depth.	Nipples.		Ensiform.		Index.	
						Ant.	Trans.	Ant.	Trans.	Length.	Breadth.
1	31	146	68.5	11	6	8.2	10.8	7.1	10.5	98	76
2	42	165	68.5	11.2	7	9.2	11.3	9.5	11 2	101	81
3	40	155	64	10.5	6.5	8.6	11.5	8.5	11 3	109	74
4	24	158	69.5	14	6.2	8.3	10.5	8.5	11	75	79
5	37	174	70	14	6.2	8	12	8.3	11.5	86	67
6	23	163	71	12.6	6	8.2	11.4	7.5	12	90	72
7	28	164	71	13.2	5.6	7.2	11.5	7	11.5	87	63
8	43	160	66	12.5	7.2	9.5	12.5	9.2	11.5	100	76
9	26	162	68	12	6	8.2	10.5	8 2	11	87	78
10	29	135	65	11.8	5.6	8	10.5	8	10.5	89	76
11	36	130	64	11.6	6	8.2	9.5	8	10	82	86
12	38	218	73	12.6	7	9.8	12.6	9.5	12	100	77
13	25	138	68.5	13	6 2	8.5	10.5	8.6	10.5	81	81
14	21	137	67	12	5.5	8	11	8.6	10.8	92	73
15	27	178	72	13.8	6.5	9	12.3	8.2	12.2	93	73
16	38	140	67	13	6	8	10.6	8	11	82	75
17	34	142	70.5	13 5	6.3	8.5	10.5	8.8	10.2	78	81
18	28	158	68.5	13.6	6	8.2	12	8.5	11.6	88	68
19	29	130	66 5	12.2	6	8 5	10.5	8 2	10.5	85	81
20	29	154	66.25	12.5	6	7.5	10.6	7.5	11.2	85	70
21	31	128	68.75	12.2	5.5	7.5	11.5	7.5	11.5	94	65
22	22	132	67.5	12.5	6	8	10.6	7.5	10.8	85	75
23	24	134	65 25	12	6	8	11	8	11	92	73
24	46	150	65.5	13	6	8	11 5	8	11.2	85	69
25	27	152	68.25	12.5	6	8	10.8	7.5	11.2	86	74
26	24	130	66.25	12	5.5	8.8	10.2	9	10.5	84	86
27	28	141	68.5	13.5	5.5	8.2	9.6	8.5	9 5	71	85
28	44	138	65.5	11	6	8.5	11.5	9	11.5	104	73
29	26	149	66.5	12	6	8	12	8	11.5	100	69
30	25	147	66.5	12	6	8	11	8	11.4	92	73
31	32	142	65.5	13	6	8	11	8	11.2	83	73
32	26	140	67	11.5	6	7	11.3	7	11	98	62
33	26	128	68	13	5.6	7.5	10.2	7	10.5	78	73
34	44	174	65.75	11.5	6.5	9.6	11.7	9.5	11.5	102	82
35	38	152	71	13	6	8	11.3	7.5	11.2	81	71
36	28	175	68	12	6.5	9.2	12	9	11.6	100	76
37	30	136	68.5	13.5	5.6	8.2	11.2	8.2	11	83	73
38	36	139	69.5	12.6	6	7.5	10	7.5	10	78	75
39	27	140	66.5	12	6	8	10	8	11	83	80
40	31	144	68	13	6	7.5	11.2	7.6	11.6	80	61
41	33	130	68.25	13.6	5.5	7.5	10.6	7.6	11	78	71
42	29	160	66.75	11.6	5.7	8.2	11.1	8.2	11.2	86	74
43	26	140	66.5	12.5	5.6	7.3	10.6	7	11	85	69
44	22	134	67.25	14.2	5.5	7.1	11	7.5	11	77	65
45	26	154	67.25	13.5	6.3	8.2	10.7	8.2	11	78	77
46	26	130	65.75	13	6.6	8.5	10.5	8.2	10.5	81	81
47	27	140	66.5	13	6.2	8	11.3	7.6	11.2	81	71
48	31	136	67	12.2	6	8	11.2	8	11	92	72
49	26	130	65.75	13	5.6	7 6	10.5	8	11	81	72
50	28	140	67	13.2	5.8	7.8	11	7.5	11.2	83	71
Average Indices										87.3	73.6

	Length.	Breadth.
Indices Series from Buffalo General Hospital	80.2	71.5
" " " Garrison Hospital	89.0	72.6
" " of enlisted men	87.3	73.6
Average	85.5	72.5

My measurements were as follows:

1. Length of chest from center of clavicle to lowest point of cartilage of tenth rib, a nearly vertical line on an inch outside of the nipple. 2. Anteroposterior (sagittal) diameter of chest from upper border of sternum (notch) to spine of opposite dorsal vertebra. 3. Anteroposterior diameter (sternum to dorsal spine horizontally opposite) at a line drawn through the nipples (fourth costal cartilage). 4. Transverse diameter at the same line. 5. Anteroposterior diameter at tip of ensiform cartilage. 6. Transverse diameter at same level. From these two indices, like the cranial indices, are constructed, the *length index* found by dividing the breadth at the nipples (four) by the length (one) and the *breadth index* found by dividing the anteroposterior diameter at the nipples by the transverse at the same level. Hence, the lower the index the longer and flatter (more bellows-like), respectively, the chest. From these three series the normal indices would appear to be length index, 85.5, breadth index 72.5.

I believe these figures will not be changed more than 1 or 2 per cent., for all these series agree very closely and the enlisted men have all passed a most rigid physical examination and are of such splendid physique that it is a pleasure to see them strip. Every one of them might be described as "certified normal."

The next table is a series of fetal, infantile and child measurements in which can be clearly traced a more or less regular transition from a high, round, short chest of quadrupedal breadth index to the flattened and slightly elongated chest of adult human form.

CHEST MEASUREMENTS. CENTIMETERS.

Fetuses (Normal)	Length.	Top sternum.	Nipples.		Tip Ensiform.		Index.	
			Ant. p.	Trans.	Ant. p.	Trans.	Length.	Breadth.
1. 3 months	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
2. 7 " (twin)	5.0	3.0	3.9	3.9	4.0	4.5	. . .	. . .
3. 7 " "	5.5	3.5	4.8	4.7	5.0	5.0	. . .	. . .
4. 7-9 (?)	6.0	4.5	5.0	4.7	5.0	5.0	. . .	. . .
Average indices.	. . .	. . .	. . .	. . .	. . .	. . .	72	103
Monsters.								
5. Birth (term) Hydrocephalus	10.0	6.00	9.5	10.5	10.0	10.75	107	90
6. 7-9 mos. (?) Anencephalus	8.0	7.00	8.0	8.75	8.5	10.0	125	91
Children. (Orphan Asylum)								
1. 5 months (Rosary)	15	10.5	11.5	12.5	12.0	13.5	80	92
2. 12 "	15	10.0	12.5	13.5	13.5	15.0	100	92
3. 14 "	12.5	10.0	11.5	13 5	13.5	15.5	124	90
4. 16 "	13.5	8.0	11.0	13.0	13.0	14.0	104	90
5. 16 "	13.5	8.5	11.0	13.5	13.5	14.0	104	9
6. 20 "	15.5	8.5	12.5	15 5	13.5	15.5	100	81
7. 36 "	16.0	8.0	12.5	15.5	15.0	16.5	103	81
Av. Normal Children	. . .	. . .	. . .	. . .	. . .	. . .	103	87
Buffalo Gen'l Hospital								
8. 24 months (Rosary and slight groove)	12.5	6.5	8.75	11.00	9.5	12 0	95	80
9. 27 months (Rosary and slight groove)	12.0	6.0	10.5	11.0	12.0	13.5	108	95
10. 6 yrs (Flat chested)	19.0	8 0	13.5	14.7	14.7	15.5	82	98
11. 9 " (" ")	19.5	8.5	15.0	17.5	16.5	18.5	95	86
Average indices hospital children (older)							95	90

From this table we find the following "trial figures:" Fetal breadth index, 103; infantile breadth index (3 years and under), 87; child breadth Index 3 years and over (abnormal), 90; adult, 72.5.

As to flat-chestedness, I have made measurements of seventeen patients selected at random, from the hospital wards for their flat-chested appearance, most of them being tubercular, with the result of an average breadth index of 80 (normal 72.5). In other words all these flat-chested cases were found to have chests on an average 7.5 degrees rounder or "deeper" than the average. In only three cases was the chest flatter than the normal.

Last of all I have to present measurements of some twenty cases of pulmonary tuberculosis in all stages which, though few in number, are a surprisingly uniform series and so far as they go, fully support the contention that the typical tubercular chest is *not* a flat one, but a *round, long,* rigid chest. It may be termed, with grim appropriateness, the "coffin chest."

TUBERCULAR (BUFFALO GENERAL HOSPITAL).

1. 20 years.	Dorsal Kyphosis	19	10.5	20.5	17.5	19.5	18.5	97	143
2. 22 "	Pulmonary Tuberculosis	31	10.5	15.5	22.0	13.5	23.5	76	70
3. 44 "	Tuberc. (susp.)	37.5	16.0	22.0	28.5	21.5	29.2	78	77
4. 57 "	Chronic Bronchitis (?)	28	12.5	18.0	22 5	17.5	21.5	77	80
5. 48 "	Pulmonary tuberculosis	32	11.0	18.0	27.5	16.5	25.0	78	66
6. 52 "	" "	33	12.0	18.5	25.5	17.0	25.0	76	73
7. 47 "	" "	31.5	12.5	19.5	22.0	18.0	22.0	70	90
8. 33 "	" "	29	11.0	18.0	24.0	17.0	23.5	81	75
9. 43 "	" "	30	12.5	20.5	24.5	17.5	25 0	83	84
Average Indices								77.3	77
Indices of short series (Tubercular) Erie Co. Hospital								82.6	79
General average "Tubercular" Indices								79.9	78

All chests in which there was emphysema or reasonable suspicion of it, were omitted. The indices were: Tubercular patients (19), length 79.9, breadth 78; normal individuals, length 85.5, breadth 72.5. In other words, the consumptive chest appears to be nearly 6 degrees both longer and rounder (deeper) than the normal, so that persistence of the fetal rounded or keeled type with a further reversion to the elongated ancestral type (both of which as already explained impair the efficiency in the erect position) would appear to co-exist at least with a predisposition to phthisis. If this is sustained by more extended measurements it will furnish a most valuable indication for climbing exercises and outdoor life in the chest measurements of children and young adults.

When we remember, in this connection, that the lung in the consumptive is really slightly *more* voluminous than normal, and that, as I have elsewhere suggested, the predilection of the tubercle bacillus for the lung is due to the ancestral recentness of the latter, constituting it the point of least sterility and resistance in the entire organism, it will be seen that the importance of this method of study is likely to be great. If it will help us to detect even a possible predisposition before the bacillus has gained a foothold it will bring us face to face with the hopeful and promising problem of prevention, instead of the discouraging and difficult one of cure. A month of tree climbing may be found worth a gallon of tuberculin.

PHARMACOLOGY OF STROPHANTHUS.

Presented in the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-eighth Annual Meeting of the American Medical Association held at Philadelphia, June 1-4, 1897.

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To Professor Fraser, more than to any one else, belongs the honor of having brought this drug to the notice of the medical profession, and for having determined in a general way its pharmacology and clinical value. I shall not discuss the botany, chemistry or therapeutics of the drug, as these questions have been treated in an appropriate manner by others. I have verified nearly all the important points made in this paper by experiments on animals, using for this purpose freshly isolated strophanthin, and 5 per cent. tinctures, tested by pharmacologic methods, prepared from drugs bought on the open market as strophanthus kombé. The strophanthin from this source is as active as the best strophanthin procurable, and more so than the majority of samples, which vary greatly in strength. Indeed, it was nearly one hundred times as strong as one lot which I examined, and which was claimed to be a chemically pure article.

In general, strophanthus, or rather the active constituent strophanthin, is primarily a nerve and muscle poison, which affects the functions of the various tissues of the animal body in a special manner, in therapeutic doses slowing the pulse, lengthening the systole and diastole, increasing the blood pressure, and the efficiency of the cardiac muscle; and in toxic doses producing rapid paralysis of the heart.

Gley has shown that the local anesthetic action of strophanthin when brought in contact with the conjunctiva is about ten times as great as that of cocain, and that it persists much longer. Steinbaugh, from a long series of experiments on men and animals, concluded that this anesthetic action is not due to strophanthin, but to some other constituent which, when in a pure state, does not cause irritation or produce unpleasant after-effects. Hare and de Schweinitz, in attempting to confirm this work, concluded that Steinbaugh was mistaken and that the substance he used in his experiments was in reality strophanthin, which these authors declare to be a very dangerous drug in ophthalmic practice, since its application may be followed by inflammation and sometimes by ulceration.

Fraser, Boyd, Rovighi and others, claim that strophanthin has an antipyretic effect on patients suffering from various diseases. Martin found the reverse. My experiments on dogs show that a slight lowering of temperature may be produced in normal animals. These investigators also report that the drug is a true cerebral sedative. Their observations were made upon patients suffering from various diseases, and upon animals. In my studies sleep was one of the most constant symptoms noted in dogs, rabbits and guinea pigs under full doses of the drug. Brunton, Baubeyer, Evans and others claim that strophanthus does not have a cumulative action when given for a long time. I have found that if very large doses are given to animals on successive days the second or third dose may be fatal. Especially is this true with rabbits, but generally doses very much greater than should ever be given for therapeutic purposes are well borne by dogs for a number of weeks in succession. In some instances the system becomes more tolerant, as noted by Fraser.

Strophanthus is locally irritating and stimulating to the gastro-intestinal mucous membrane (Wood). It, however, produces much less disturbance to the stomach than does digitalis; in fact some authors claim that therapeutic doses act as a mild stomachic. Clinical experience shows that in many cases strophanthus can be given where digitalis is contraindicated on account of the nausea and vomiting produced.

Strophanthus causes paralysis of striped and unstriped muscular tissue. The quickness with which this result is attained depends upon the concentration of the solution employed.

Like the other members of the digitalis series, strophanthus stops the frog's heart in systole, whether administered subcutaneously or locally. At first the pulsations become slower and more powerful; then the contraction changes to a peristaltic movement, the ventricles dilate less and less, and finally the ventricular cavity is completely obliterated, even when strong efforts are put forth by the auricles to expel their contents. Soon the auricles also cease to beat. This change occurs even when the inhibitory mechanism has been paralyzed by atropin; therefore, it must be due mainly to the action of the drug upon the muscular fibers themselves. The Strassburg school claim that the systolic condition is due to increased elasticity of the muscle fibers. The work of Roy, however, has thrown considerable doubt on this point, while Cushny thinks the ultimate systolic condition is probably due to increased contractility. The whole question is far from settled at the present time.

Since strophanthus is generally used in the treatment of diseases of the circulation, a consideration of its action on the heart and blood vessels of animals is of chief importance. The normal circulation of the

animal body, with its many variations that may influence the blood supply to this or that particular organ, is maintained mainly by the action of the heart and the muscular fibers of the arterioles under the influence of the central nervous system, which in turn is regulated by the different afferent impulses or direct influences reaching it. To understand the action of strophanthus upon these factors is to rationalize its therapeutic employment in those cases where the organism is suffering because of some pathologic condition of its vascular mechanism.

Pharmacologists are very well agreed that digitalis, strophanthus, lily of the valley, and the other members of the group have the same qualitative action upon the circulation, but the quantitative relation of the various drugs of the series to the different physiologic factors has been only partially worked out. Most of the work has been done on strophanthus and digitalis. When these various quantitative relations have been settled we shall be able to apply one or another of these remedies, as the case may be, with the greatest certainty according to the pathologic conditions presented in the patient.

A careful study of the papers of the early experimenters on digitalis shows that section of the vagus does not entirely prevent slowing of the heart, but if atropin be given the rhythm becomes normal; consequently the decreased pulse rate when therapeutic doses are employed is mainly due to the stimulation of the vagus centers, and partially to irritation of the peripheral endings of the vagus in the heart. Considerable dispute has arisen as to whether the behavior of the vagus be not due simply to the increased supply of blood to its medullary centers, but it seems to be well established that the drug has a direct action on these centers.

Brunton and others claim that the quickening of the pulse in the second stage is caused by paralysis of the vagus ends, while Schmiedeberg, Cushny and Boehn have shown that it is probably due mainly to the increased irritability of the muscular fibers of the heart. Generally with the slowing of the rhythm the most constant result noted is the increase in blood pressure; but this does not always occur, especially where there is extreme slowing. Brunton and many others regard the increase in pressure after administration of digitalis as due mainly to the constricting action of this drug upon the peripheral circulation, but confess that strophanthus does not narrow the caliber of the arterioles.

Fraser found, by perfusion experiments with strophanthus, that exceedingly large doses of the drug are required to produce even transient constriction of the vessels. Popper claims that with strophanthus the vessels are redder than before. Delsaux, Bradford and Philipps found that the volume of the kidney remains unchanged when studied with the oncometer.

My experiments on various animals convince me that no constriction of the vessels is produced by therapeutic doses of strophanthus. The increased blood pressure must be due mainly to direct action upon the heart.

Popper claims that venous pressure falls as the arterial pressure rises. Little experimental work has been done to prove this point.

Popper and Knoll find that the blood pressure has less influence on the pulmonary circulation than on the systemic circulation. Gley found that curare does not alter the action of strophanthus on the blood pressure, which consequently does not depend on changes in respiration.

Rolleston claims that the maximum pressure in the left ventricle and the output of the heart are increased and the circulation quickened by strophanthin.

Roy and Adami found that strophanthus at first increased the force and efficiency of the papillary muscles, with only slight effect on the walls of the ventricles; large doses quickly paralyze these muscles, having less action on the ventricular walls. Dissociated contractions of the ventricles and auricles occur before this final paralysis.

The recent exhaustive paper of Cushny on the digitalis series has very largely cleared up the question of the relations of increased muscular irritability and central peripheral vagus action. He employed the myocardiagraph, which records the relative distance between two points on the heart, and the cardiometer, which measures the volume of the heart at successive stages, and consequently registers the amount of blood ejected by this organ. These two instruments were of the form devised by Roy and Adami. Cushny divides the action of the drug into: 1. The vagus stage, which is characterized by the results of the vagus stimulation and the direct action on the heart muscle itself. 2. The periodic stage, which begins with acceleration of the ventricles. He examined the movements of the four chambers independently, and also determined their relation to each other when under the influence of strophanthus, employing the myocardiagraph. When small quantities of the drug are administered intravenously there is marked slowing of the rhythm of the heart, the ventricle dilates more fully, and systole is more perfect. The sequence of these changes is not always the same. The slowing and increased contraction are the most constant manifestations noted. Cushny agrees with Ackerman that the former is due to inhibitory action of the vagus, and claims that the increased dilatation is also due to inhibition. Neither slowing nor dilatation occurs when atropin is administered, but this substance has no influence on the increased contractility, which must consequently be due to the action of strophanthus on the muscle fibers themselves.

Without atropin the rhythm is decreased, diastole and systole are more pronounced, and the blood pressure is raised. Tracings taken on fast moving drums show the same, also that the slowing is mainly due to the lengthened diastole, although the pause in systole is somewhat greater. The slowing and increased diastole are the same as when the vagus is stimulated. The time of the relaxations and contractions remains the same as before in the normal animal.

The muscular action of strophanthus is the same on the auricle as on the ventricle, but is less apparent and may be concealed, owing to the greater influence of the vagus, exerting more opposition to the increased muscular iritability. Shortly, if the drug is pushed, what may be called the pause phase begins to manifest itself and the rhythm, which heretofore has been the same in the auricles and ventricles becomes changed. Irregularity and skipped beats may occur in either chamber first, after which the rhythm of the superior and inferior portions of the heart exhibits wide divergence. The systole and diastole become more and more incomplete, until finally considerable pauses are noticed, especially in the auricle. The two sides of the heart after a few intermittent beats begin suddenly, showing a much accelerated rhythm, but

the rhythm of the auricles and that of the ventricles is entirely independent, and impulses no longer pass from one to the other.

By careful estimation of the amount of blood passing through the heart as recorded by the cardiometer during the first stage of strophanthus action, Cushny maintains that, "the contraction volume or output of the ventricle per beat is uniformly much increased, whether slowing of the rhythm is marked or not. This is, of course, due to increased systole, augmented in some cases by increased diastole of the ventricles." The amount of blood expelled per unit of time varies according to the amount of slowing produced. Where the rhythm is only slightly lessened the output is increased, but if it is greatly retarded the output is below normal.

This increased work must be due to increased muscular action, since Roy and Adami find that the heart ejects less blood when the vagus is stimulated. The increased dilatation of the ventricles due to vagus stimulation, helps to offset the slowing. If the nervous mechanism is paralyzed with atropin the contraction volume is greater, owing to more perfect systole and the output is uniformly increased.

Blood pressure is raised during the first stage, even before a change in the heart is noticed. In general, during the first stage analogous results are shown by the myocardiagraph, cardiometer and kymograph, slowing and increased work; if atropin is used increased work without slowing.

I have dwelt at length on the primary action of strophanthus because it is never desirable to go beyond this stage under any condition in the therapeutic application of the remedy. In fact it is not wise to produce more than a moderate degree of the first stage, as better filling of the vessels is secured when the rhythm is but moderately decreased.

At the close of the first stage, as already mentioned, the ventricular and auricular contractions become slower and slower, and may occasionally skip; soon, however, the irritability of the muscle becomes so much increased that the restraint of the vagus is thrown off and the ventricles usually first, soon followed by the auricles, show an accelerated, very irregular rhythm, the ventricles beating together, and the auricles also having the same rhythm, while the normal sequence of the respective contractions is entirely destroyed. The inhibitory mechanism still acts, but is entirely insufficient to control the exaggerated muscular activity. The individual beats of the different chambers are very irregular and the amount of work is greatly lessened; soon the spasmodic effects of the organ cease, generally in the auricles first, in a position somewhat nearer diastole than systole; then follow delirium cordis and complete dilatation.

Knoll, working with a less perfect myocardiagraph than that devised by Roy and Adami, obtained results which correspond quite accurately with those obtained by Cushny. Neither Cushny nor Knoll has yet completed their observations on the action of the heart during the second stage. During the second stage there is generally present an increased excitability of the central nervous system, and violent movements of the respiratory and other muscles occur, the animal appearing much as though under the influence of one of the convulsive poisons.

It has been found from extensive experiments that diuresis is one of the most constant results noted when strophanthus is administered to healthy individuals (Semoine) or to patients suffering from various cardiac lesions (Fraser, Semoine, Wood and others). The diuresis may be due entirely to increased blood pressure, to direct renal action (Wood), or to a combination of the two. The action of strophanthus is very much more rapid, and the drug is eliminated from the system more quickly than is the case of digitalis, presumably because of the greater solubility of its active constituent strophanthin, which is probably excreted in the urine (Wood).

During the past two years with a view of ultimately being able to standardize all the various preparations of the digitalis and strophanthus series by physiologic methods—since they can not be assayed by chemic means—I have examined hundreds of samples of crude drug and active constituents, as purchased on the open market or procured from private sources. The task is indeed a difficult one, owing to the small amount of quantative work that has been done. Sufficient data have already accumulated to convince me that the task of perfecting pharmacologic methods for standardizing all those powerful drugs and chemicals which can not be assayed by other methods is not a hopeless one. Owing to the ready solubility of strophanthin, the preparations of strophanthus are perhaps the most easily standardized of the heart tonics.

As already stated the strophanthin on the market varies greatly in strength. The same is true of the crude drug. As physicians, I believe the time has come when we should demand at least a qualitative pharmacologic examination of these drugs before they are made up into pills, tablets, tinctures, fluid extracts, etc.

The sphygmographic work of Fraser, Paschkis, Zerner and especially Wilcox, shows that strophanthus produces the same effects on the circulatory apparatus of man as upon that of other mammals. The fatal dose of strophanthus varies for different groups of animals. Reusing and others claim that strophanthus is at least twenty times as strong as digitalis. Fraser claims it is 300 times as strong. I have found one sample of strophanthin sufficiently powerful to kill medium-sized frogs in doses of 1-7000 of a grain. For therapeutic use I believe 1-300 to 1-200 grain of strophanthin, and from 3 to 5 drops of a 5 per cent. tincture to be the correct dose.

Briefly summarizing the pharmacology of strophanthus we may say that its chief action is upon the nervous mechanism controlling the action of the heart, and upon the heart muscle itself, lessening pulse rate, increasing the blood pressure and augmenting the work of the heart; without causing constriction of the arterioles or any special action on the vasomotor mechanism; the diuresis and other important results being due mainly to improved circulation.

Its special advantages over digitalis may be briefly stated as follows: It does not produce gastric disturbances, and does not show cumulative action. The constriction of the vessels by digitalis may be a source of great danger owing to the extra strain thrown on the ventricle, especially in fatty heart. Strophanthus has no such tendency. It acts quicker and with greater certainty. Owing to its ready solubility it is better for hypodermatic administration, and the strength of its preparations can be more easily standardized.

Let us have a Department of Public Health!

STROPHANTHUS; A CLINICAL STUDY.

Presented in the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, June 1-4, 1897.

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For many years I have been convinced that the very discordant reports made by competent observers were due to the fact that the source of strophanthus preparations was varied, for otherwise it would be impossible to believe that excellent effects could be obtained from one preparation while another would give rise to alarming or even dangerous symtoms. And further it is impossible to believe that the very large doses so frequently mentioned in literature could be safely administered, if the preparation had been made from an active crude drug.

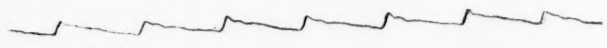
Last January, I read a paper before the Medical Society of the State of New York which was published in the May number of the *American Journal of the Medical Sciences* giving the results of a careful study of strophanthus kombé. In this paper I stated that I believed that kombé was not a variety of strophanthus hispidus, but a distinct species. In that study based on extended observation of twelve patients I made use of a tincture prepared according to the terms of the "United States Pharmacopeia," and standardized by physiologic methods, reaching the following conclusions: That success in the administration of strophanthus requires; an active well-made preparation from a reliable source; avoidance of its use in fully or overcompensated hearts, or in those which present advanced muscular degeneration or mechanical defects of high degree; the use of not too large nor too frequently repeated doses.

From these observations it was apparent that a dose of five drops of this preparation, three or possibly four times a day, is sufficient. From this preparation of strophanthus kombé (pubescent variety), we could discover in a short time that the line of ascent of the tracing of the pulse as taken with the Dudgeon sphygmograph became longer and more perpendicular, the distance, between the successive apices longer, the dicrotic wave disappearing, while the irregularities were almost always overcome. In other words, under the influence of this preparation the force of the heart beat became stronger, its rate slower and its rhythm more regular. This change took place without any change in blood tension other than could be justly attributed to a more powerfully and evenly acting heart. Coincident with these changes in the pulse there were also equally well-marked changes in the pitch, volume and quality of the heart sounds, clearly indicating that the heart was working under a better mechanical advantage. With all these changes as determined by physical signs, the patient would note the relief of breathlessness, the diminution of pain, the disappearance of swelling, the increased flow of urine, the improved appetite, and the disappearance of palpitation or, if the last did not disappear, fluttering was changed to more forcible apex beats. These conclusions are, I believe, fairly presented and justly based on the observations recorded in the above mentioned paper.

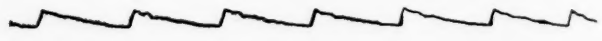
As I have said above, the study was made of a single preparation from a single drug source. It is my purpose now to give you the results of my observations on other preparations from other drug sources. Early in March of this year I received, from Dr. H. H. Rusby, fluid extracts made from different species of strophanthus. The following are the observations:

A.—Fluid extract of strophanthus hispidus, from No. 16 powder containing 1.815 per cent. of strophanthin.

Case 1.—This was administered to a woman aged 35 years who, on March 14, complained of constent dyspnea, swelling of feet, severe chest pains, and palpitation. Physical examination showed moderate aortic obstruction, marked mitral incompetency, slight mitral obstruction, with long standing myocarditis. The dose was five drops in a wine-glass of water after meals. The following is the pulse tracing.



March 28. The patient announces that the breathlessness and palpitation are relieved but the medicine causes four or five watery, rather painful movements. The dose is reduced to four drops.



April 7. The patient has now no swelling of the feet but still complains of the diarrhea. The dose is now reduced to two drops.

April 21. The patient has complained of some nausea, but the symptoms of the cardiac lesion have become less; however, it is thought best to abandon the use of the drug.

B.—Fluid extract of strophanthus hispidus from No. 30 powder containing 1.726 per cent. of strophanthin.

Case 2.—April 1. A young woman 26 years of age has been troubled with palpitation and pain in the heart on exertion: she had noticed an enlargement of the neck for the past four months. Physical examination revealed a simple goiter, mitral incompetency and dilatation of the left ventricle. The patient received four drops of this preparation.

April 7. The palpitation has been somewhat less severe and the pain has diminished. The goiter is slightly softer.

April 17. The patient complains that the medicine nauseates and requests its discontinuance.

Case 3.—A woman aged 55 years, very obese, has suffered from swelling of the feet, palpitation and dyspnea for about two years. Physical examination revealed mitral insufficiency with considerable dilatation of the left ventricle and presumably a fatty degeneration. Two drops were given thrice daily on April 2.

April 9. The symptoms are slightly relieved.

April 16. There is considerable improvement in the dyspnea and the edema has disappeared.

April 23. The palpitation is still marked but less than formerly. As the improvement is not sufficiently great and the patient complains of the griping and diarrhea the medicine is omitted. (See E.)

Case 4.—A woman 64 years of age has been breathless for many years particularly on exertion. She was thin, active but tired easily. Examination showed considerable mitral obstruction and incompetency with slight aortic obstruction. The muscular wall of the ventricle is in fair condition. Three drops were ordered thrice daily on April 23.

May 9. The patient has observed considerable caution in her movements and feels stronger.

May 16. She does not tire so easily, but complains of loss of appetite.

May 23. The shortness of breath is markedly better, but some nausea has appeared.

C.—Fluid extract of strophanthus kombé (pubescent variety) from No. 30 powder containing 3.372 per cent. of strophanthin.

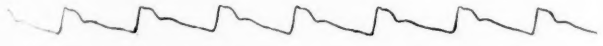
Case 5.—On March 24 a woman 55 years old presented herself complaining of fainting sensations on exertion, extreme nervousness and mental depression. She was found to have thickened aortic valves and a dilated left ventricle. Three drops, thrice daily were ordered.

March 31. There has been no return of the fainting sensations.

April 7. The mental depression is less but the appetite is poor.

April 14. On account of the loss of appetite the amount of the drug is diminished to two drops. The nervousness is less.

April 21. In spite of the diminished dosage, diarrhea is now complained of and some abdominal pain.



April 28. The digestive symptoms are still annoying.

Case 6.—A rather stout but active woman of 60 complained of swollen hands and feet, headaches, dyspnea and oppression on exertion. Examination showed insufficiency of the mitral valve, ventricular dilatation, possibly fatty infiltration. Two drops of the preparation were given thrice daily on March 28.

April 7. The edema has become considerably less.

April 9. An attack of vomiting with purging commenced today, and medicine is now omitted.

April 14. The strophanthus is now resumed, the digestive symptoms having been attributed to dietary indiscretion. The edema has returned.

April 21. The headaches and oppression are relieved; the edema is less.

April 28. Nausea has appeared for all that the symptoms of cardiac debility are less.

Case 7.—On March 31 a woman aged 41 years applied for relief from persistent headaches, palpitation and precordial distress on exertion, from which she had suffered for many years. Examination showed some aortic regurgitation with marked mitral obstruction and less apparent regurgitation. She received four drops thrice daily.

April 2. The headaches are lessened in severity, but the palpitation is persistent.

April 7. The precordial distress appears only on severe exertion.

April 9. Headaches have been absent since last report, but the appetite has become seriously impaired.

April 16. The patient complains of loss of appetite, but admits the improvement in other symptoms.

April 23. There have been two attacks of diarrhea and the condition of the appetite is unchanged. (See I.)

Case 8.—On April 1 a man aged 52 years complained of great breathlessness, fainting sensations, fatigue on slight exertion, which had become gradually worse during the past six months.

Examination discovered slight aortic obstruction, marked mitral incompetency, with extreme ventricular dilatation. Three drops were ordered thrice daily, with rest in bed.

April 5. The dyspnea has improved.

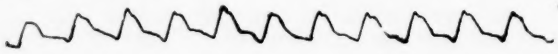
April 9. There have been no fainting sensations since last report.

April 14. The improvement still continues. He may now recline on a sofa during the daytime.

April 16. The patient complains of nausea. The dose is diminished to two drops.

April 22. The nausea has disappeared, but total inappetence has arisen. On two days there has been diarrhea. One drop is to be given thrice daily.

April 26. The condition of the patient has remained unchanged. (See H.)



D.—Fluid extract made from strophanthus kombé (non-pubescent) No. 30 powder containing 1.87 per cent. of strophanthin.

Case 9.—A man aged 42 has suffered from gouty attacks for several years. He is easily fatigued, suffers from precordial oppression and pains extending down left arm. He was found to have aortic obstruction, probably secondary to degeneration of the conus arteriosus, with considerable ventricular dilatation. On March 26 he was directed to take five drops thrice daily.

April 3. There have been no attacks of pain in the arm.

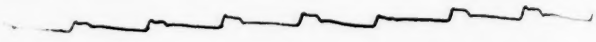
April 10. The oppression is less marked, but the fecal movements are softer in consistency.

April 17. The strength has improved, but the appetite is impaired. The character of the movements is unchanged.

Case 10.—On March 28 a man aged 31 consulted me for the relief of palpitation, chest pains, slight swelling of the feet and dyspnea on exertion. There was found on examination a fairly well compensated heart, but presenting aortic obstruction and mitral incompetency. Four drops of the preparation thrice daily were ordered.

April 7. The edema has entirely disappeared and the pains are slightly better.

April 12. Improvement continues.



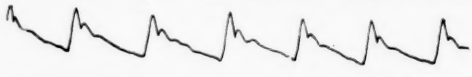
April 19. The dyspnea is considerably improved and the general condition good.

April 26. The improvement is not so marked and but little progress has been made.

Case 11.—A woman aged 67 consulted me on March 23 for painful swelling of the feet, cough, headache, restless sleep and dyspnea. Examination revealed marked incompetency at both aortic and mitral orifices, with moderate dilatation. Three drops were ordered to be administered thrice daily.

April 5. The feet are still swollen, but less painful: the cough has disappeared.

April 19. For all that the headaches, disturbed sleep and shortness of breath are better, a severe attack of diarrhea during the past four days, which was not accompanied by either nausea or vomiting, necessitated the omission of the drug.



Case 12.—A woman 48 years of age complained of general weakness, swollen feet, headache, disturbed sleep and dyspnea. Examination showed slight aortic obstruction, with both incompetence and obstruction at the mitral orifice. There was slight dilatation. On March 24 three drops were ordered thrice daily.

April 7. The sleep has improved and the feet are less edematous.

April 14. The headache has disappeared, the dyspnea is less and considerable exertion is possible without distress, but the appetite has been entirely lost. (See F.)

It will be noticed that in nearly all the cases the symptoms which brought the patient to the physician were relieved; in some they entirely disappeared. On the other hand the investigation had not been long in progress before it was apparent that the preparations were causing digestive disturbances varying from simple inappetence, nausea and vomiting to abdominal pain and diarrhea. Were it simply a question of purgation these untoward symptoms might be disregarded

or possibly it might be considered to be beneficial in that it might relieve the edema. Yet on the whole the irritating properties of the fluid extracts as concern the alimentary tract are undesirable and certainly limit their employment within narrow lines. The behavior of the fluid extracts is in marked contrast to that of the tincture, which in none of the twelve cases recorded in my previous paper, created any digestive disturbance.

The following observations were made upon hypodermatic tablets of strophanthin from the same manufacturer as of the fluid extracts.

E.—Hypodermatic tablets, one two-hundredth of a grain each, obtained from a No. 30 powder of strophanthus hispidus which contained 1.726 per cent. of strophanthin.

Case 3.—(See above.) On April 25 the patient was directed to take by the mouth one tablet dissolved in a teaspoonful of water before each meal.

May 2. There are at present no intestinal symptoms.

May 9. The palpitation is much improved and the dyspnea is entirely relieved.

May 16. The patient presents an excellent appearance and the cardiac sounds are distinctly stronger.

F.—Hypodermatic tablets, one two-hundredth of a grain each, from No. 30 powder of pubescent strophanthus kombé containing 3.372 per cent. of strophanthin.

Case 12.—(See above.) One tablet is given as above, commencing April 17. During the three days' abstinence from medicine the appetite has been regained.

May 13. The swelling of the feet has entirely disappeared, the sleep is tranquil and the patient expresses herself as greatly improved.

G.—Hypodermatic tablets of one two-hundredth of a grain from No. 30 powder of non-pubescent strophanthus kombé containing 1.87 per cent. of strophanthin.

Case 13.—On April 4 a woman aged 56 years complained of weakness, headaches, palpitation and precordial distress, the last two symptoms being especially marked on exertion. On physical examination there was found marked mitral insufficiency, slight aortic obstruction (vegetations) with marked dilatation of the left ventricle.

April 10. The patient feels stronger and suffers less from headaches.

May 3. The palpitation had improved and the distress is less upon exertion.

May 17. The appetite and bowels are in excellent condition and there is general betterment.

May 24. The patient feels much stronger and had not suffered from headache since last report.

H.—Hypodermatic tablets of strophanthin, one two-hundred and fiftieth of a grain each, from strophanthus kombé (pubescent variety).

Case 8.—(See above.) On May 6 one tablet was directed to be taken dissolved in a teaspoonful of water before each meal. The diarrhea and inappetence had disappeared.

May 9. The dyspnea has markedly improved.

May 12. The patient now sits up the greater portion of the day.

May 15. There has been a great gain in strength.

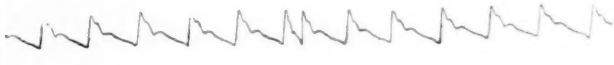
May 19. The dyspnea has entirely disappeared and moderate exertion is possible without fatigue.

Case 14.—A woman of 60 has been unable to walk without fatigue for several years. She also complained of swollen feet, fainting, dizziness, pain in left side of chest and a persistent cough. Examination on May 6 revealed a well-marked incompetency of the mitral orifice and extreme dilatation of the left ventricle. One tablet was ordered to be given as above.

May 20. The cough, dizziness and edema have diminished and the pain in the side has disappeared. This instance is notable for the rapidity of relief.

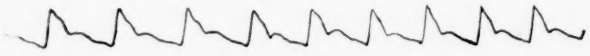
I.—Hypodermatic tablets of one three-hundred and fiftieth of a grain from strophanthus kombé (pubescent variety).

Case 7.—(See above.) On May 6 the patient reported that there had been no further attacks of diarrhea and the appetite had returned.



May 8. The patient feels stronger.

May 10. The palpitation is markedly improved and distress is no longer felt.



May 14. The heart sounds are distinctly more vigorous and the general improvement continues.

May 21. There has been no palpitation since the last report and the cardiac first sound is improved in quality, pitch and intensity.

Case 15.—A man aged 25 years consulted me with reference to persistent headaches, general weakness, excessive nervousness and palpitation. Physical examination on May 9 showed mitral incompetency with slight dilatation of left ventricle. One tablet was given as above.

May 15. The palpitation is lessened and the patient is less nervous.

May 22. There has been no headaches nor palpitation since last report. The patient feels markedly stronger and can endure less fatigue.

Case 16.—A woman aged 26 years had suffered from fainting, dizziness, headaches, and palpitation for three months. Examination revealed an anemia and probably a secondary dilatation of left ventricle with consequent mitral incompetency. On May 14 she was directed to take one tablet as above.

May 21. Although this report covers but one week yet there is distinct improvement as regards fainting, headaches and palpitation. The anemia is not appreciably changed, although the cardiac first sound is distinctly stronger.

On studying the histories of these patients it will be observed that there was no digestive disturbances produced by the tablets; this is marked contrast to the results of the administration of the fluid extracts. It will be further observed that in the case of the three first mentioned tablets that the source was the same as of the last three fluid extracts.

From my observations we may fairly conclude: 1. The tincture of strophanthus kombé (pubescent variety) is an active and eligible preparation of which the maximum dose should be five drops four times daily. Of the tinctures made frem strophanthus hispidus, which are found in the shops many are inert or nearly so. 3. The fluid extracts of strophanthus hispidus and of strophanthus kombé (both varieties) are unsuitable preparations on account of the digestive disturbances which they occasion, and these appear to be independent of the amount of strophanthin contained in the crude drug. It is likely that the character of the preparation is responsible for these untoward effects and possibly it may be so changed that these objections will be removed. 3. The hypodermatic tablets of strophanthin as prepared from all kinds of strophanthus and are satisfactory preparations in dose of from 1-350 to 1-200 grain, and are not irritating to the digestive tract. The source of the glucosid, and the strophanthin percentage of the crude drug are apparently without influence on their activity. The reputation which strophanthus enjoys, of being an irritant drug is probably based on the use of the fluid extracts.

These tablets do not, so far as limited experience indicates, irritate when used hypodermatically and the smaller dose (1-350 gr.) seems to be sufficient for all practical purposes.

I had hoped to be able to report on the clinical use of strophanthus bracteatus, but have not been able owing to failure to obtain a supply of the crude drug. If I might base an opinion on the excellent researches of Boinet it is likely to prove to be an irritant to the alimentary tract and in spite of its demonstrated action upon cardiac muscular fiber, it is probable that its clinical use would of necessity be marked by caution in administration.

This paper has been written in the hope that the profession may learn to carefully determine the mechanical problems which present themselves in the treatment of cardiac diseases and meet the indications with scientific precision. The advantages of approved preparations of strophanthus over digitalis are: 1. Greater rapidity of action. 2. Absence of so-called cumulative effects. 3. Non-interference with the caliber of the arteries. On the first point it can be truly said that reliance on digitalis for the emergencies which may occur in surgical cases is absolutely without a scientific basis. On the second the fact that digitalis has ceased to be quite as harmful, as it might be helpful, only since the practice has become general to combine it with a nitrite is sufficient reason for the use of strophanthus. And lastly the marked safety of strophanthus in the aged, nephritic, gouty and atheromatous, as well as the fact that it should be the cardiac remedy for children, needs no argument for the search for reliable preparations. The reputation of strophanthus has suffered in the past from the variability, unsuitability and unreliability of the commercial preparations. That is now removed and we know the dose and the preparation on which we may rely. I ask for the drug the same careful study and observation which has been accorded to digitalis, and I doubt not that a just verdict will be reached within as many years as decades elapsed before digitalis came into scientific employment.

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DISCUSSION.

Professor REMINGTON of Philadelphia—We are undoubtedly reaching a point where the relations of pharmacy and general medicine are coming closer and closer. I can not discuss the physiologic action of the drug; but I may discuss some of its physical and chemic qualities, and the difficulties which he had in making preparations of the remedy. I understood Prof. Wilcox to say that from the use of the fluid extract of the drug he obtained untoward results; but that from other preparations, such as the tincture or the glucosid itself he did not obtain these unpleasant effects. Now reasoning from analogy it is quite probable that the fatty material in the crude drug may be responsible for these effects. Fraser, in his experiments, extracted this before using. If this were done it might be that the fluid extracts would then become eligible preparations.

Dr. J. C. HEMMETER of Baltimore—It is well to have clear cut ideas in our study of the physiologic action of drugs, for the

reason that there are many organs in the body which are affected contemporaneously. The action must be limited to the organ which we are studying. The observations of the German experimenters is open to the objection that they do not confine their observations to single organs. In Prof. Wilcox's paper we had a study directed to one question, does strophanthus act as a stimulant to the heart muscle or through its effect on the blood vessels? I may recall some experiments which I made with digitalis when a student with Dr. H. Newell Martin in the laboratory of Johns Hopkins University, in order to determine the effects on the heart. The heart of a frog was isolated from all surrounding structures, including nerves and blood vessels. The heart was then placed on a warm stage, and connected with two reservoirs of defibrinated blood, in one of which the medicament was placed. By this means we could study the effect on the heart tissues by comparing its action when the pure blood was supplied with its action when the digitalis was introduced. These experiments were repeated too often and studied too closely to admit of error; they forced us to the conclusion that after the administration of digitalis the effects on the heart are due not to any action upon the wall of the heart, but entirely to its influence upon the nerves and blood vessels. This was followed by another line of experiment to study the action upon the blood vessels. In this experiment the mesentery of the living frog was placed on the stage of the microscope and immersed in warm salt solution, so as to keep the stage wet during observation. It was noticed that as soon as the drug was introduced into the circulation, there was a contraction of the blood vessels like that observed after administering ergot. I merely mention this to show the importance of confining our observations to one organ in studying the effects of a remedy.

Prof. WILCOX—I would be remiss in my duty if I did not record my appreciation of the value of the work which Dr. E. M. Houghton of Detroit has done and also my gratification that the results of laboratory investigation confirm the observations made in clinical medicine. I may say with regard to the suggestion of Professor Remington that the tincture furnished by Parke, Davis & Co. is satisfactory and no bad results follow its use, whereas the official tincture is unsatisfactory because of great variations in strength. I desire particularly to call attention to the necessity of having these preparations standardized. The crude drug varies in their percentage of strophanthin from 1.726 to 3.372, so that, according to their source, they should not only be standardized by chemic means but also by physiologic methods, if we wish to get good results from their use. Finally, I call attention to one other point: Before you get the full effect of digitalis when administered by the mouth, some forty eight hours must elapse; but you can get the same results at once from the hypodermatic injection of one two hundred and fortieth of a grain of strophanthin in about twenty minutes because of the great solubility of the latter.

Dr. E. M. HOUGHTON of Detroit—Before this investigation is complete, a very large amount of work must be done before we decide upon all the factors which must be taken into consideration in establishing the physiologic effects of strophanthus. I trust that during the coming year this work will be carried on and I will endeavor to do my part, especially in the line of physiologic investigation.

OBSERVATIONS IN THE USE OF DIPHTHERIA ANTITOXIN, WITH SPECIAL REFERENCE TO ITS USE IN MALIGNANT CASES.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics, at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, Pa., June 1-4, 1897.

BY ALEXANDER McALISTER, M.D.

CAMDEN, N. J.

In bringing this subject before you it is my purpose to confine myself to those features of the disease which demonstrate the rationale of the serum treatment, as now recommended by all leading clinicians.

The development of the bacillus of Löffler in a susceptible individual constitutes diphtheria in its primary form. The seat of development, a local lesion, is usually the mucous surface of the respiratory tract, but may be any mucous surface or flesh wound of the body. The medium of infection is atmospheric air, and the portions of the body most exposed are the tonsils because of their structure, function and situation. It is important in this connection to recall the anatomy of the tonsils. They are racemose glands, covered with reduplications of the oral mucous membrane. Their inner surface presents from twelve to fifteen orifices leading into small recesses, from which numerous follicles branch out into the substance of the gland. The orifices, recesses and follicles are lined with a continuation of the pharyngeal mucous membrane. The viscid secretions which serve as a lubricant invite to the folds of the tonsils the diphtheria bacillus; when once within these folds in a susceptible person, they not only rapidly develop, but in so doing produce toxins of most astounding virulence. In their development *per se*, they constitute the local lesion of diphtheria; as their toxic products are absorbed and carried by the circulation to every part of the system they produce indirectly the constitutional lesion of diphtheria. The pseudomembrane is always present and more or less extensive, but this does not constitute the essential lesion. The latter is the acute degenerative cell change particularly affecting the mucous membrane underlying the local lesion, but showing a marked predilection for the cardiac muscles, the kidneys, the peripheral nervous system and the lymphatic glands. In necropsies of malignant cases this cell destruction is shown in extensive localized necroses in these organs.

Diphtheria is a self-limited disease which tends toward a fatal issue. For reasons which are not now fully understood, the rapidity with which symptoms appear and the membrane spreads, or the course of the disease is run after infection, varies considerably in different persons. Next to the importance of an early diagnosis stands the question of malignancy. Formerly a malignant case of diphtheria was one that terminated fatally; but with the advent of our present superior methods of the serum treatment many cases once properly so classed recover. Malignancy now refers to the severity of a case rather than to its termination, depending on the seat and extent of the pseudomembrane and the virulency of the infection.

While the former may be ascertained by inspection we have as yet no means of knowing the latter in advance of its dire effects. The virulency of diphtheria toxins is nowhere more forcefully demonstrated than in a case of the disease in which a comparatively small number of bacilli situated in a mere speck of pseudomembrane produce a high degree of toxemia almost from the first. In such cases the bacilli of the infection are especially virulent and determine the malignancy of the resulting disease. In cases attended by extensive formation of pseudomembrane the malignancy of the disease is due to the rapidity of absorption of toxins from the local lesion or to the mechanical impediment they cause to the respiratory function. The rapidity of absorption on the other hand, depends on the particular understructure of the affected membrane. In laryngeal diphtheria the pseudomembrane is often quite extensive, yet because of the underlying membrane it is not so tough as elsewhere, and the absorption of the toxins and the resulting toxemia do not form an element of danger. On the other hand, because of the structure of the larynx and trachea and their abundant nerve supply, the immediate danger is from stenosis, spasm, cyanosis and asphyxia. Such cases show comparatively little toxemia and are generally not followed by the usual sequelæ. Glandular

enlargement, albuminuria and sthenic symptoms are wanting, and in necropsies of cases that die early, localized areas of parenchymatous degeneration in the heart and kidneys are not observed.

The opposite, however, is true where the local lesion is situated on the pharyngeal mucous membrane. Here the resisting basement membrane is displaced by glandular structure, vascular sinuses, erectile tissue and the like, and absorption takes place very rapidly. A fibrous network is situated around and among the above structures, and connects the mucous membrane to the periosteum. The glands are composed of tortuous tubules with many sinuses and oblong offshoots, all favoring rapid absorption. This applies especially to the rhinopharynx and nares where the hypersecretion which attends all acute inflammations of these parts makes the field all the more favorable to the thrifty development of the bacillus of Löffler. Vascular engorgement and accumulation of nasal secretions alike facilitate, the one in the formation of a specially dense membrane and the other in making the colony of bacilli specially thrifty. Such cases run a comparatively short acute course, and if they do not terminate fatally are followed by a train of sequelæ and attended by complications.

Barring any immediate danger from asphyxia, which is now readily met by intubation, the highest consideration in the question of treatment should always be the nature and degree of toxemia present. The danger now confronting the serum treatment of diphtheria, greater than any other, is that it be applied generally upon an empirical basis. To obviate this it is of importance that the question of malignancy and the degree of toxemia of each case be carefully studied. A scientific remedy requires to be employed scientifically. In a certain sense each case is a law unto itself. It is not sufficient to say that antitoxin must be administered during the first two, three or four days of the disease. It is possible that any case may speedily change in type and prove fatal within twenty-four hours. At times a case will run this short course when the pseudomembrane has the most innocent appearance and occupies only one or two recesses of a tonsil. If the infection could be early recognized and treated in its incipiency, nothing in the remedial art would be easier than the cure of every case of diphtheria with one moderate dose of antitoxin. But cases must be treated as they are found, and alas, many are not found until the disease has made serious inroads by damaging vital organs or arousing latent disease. "The prognosis of any case of diphtheria is always doubtful, since the mildest case may become severe and the severe may improve. The prognosis is especially grave among children and in proportion to their youth; sucklings, however, are rarely affected. The progress is more severe among patients debilitated by previous disease or faulty hygienic surroundings. The outlook in the individual is worse as the disease becomes sceptic or gangrenous, since mixed infection there exists." (Wood's "Practice of Medicine," 1897, fol. 172.)

In my own practice I have found it advantageous to distinguish between early and late cases in the question of dosage and supplementary treatment. This is not based on an estimate of the hours or days the disease has probably continued, but on the progress it has made. Though somewhat arbitrary, it seems to me the best classification that can be made for the purpose. A thorough clinical examination of the patient will generally suffice to determine to which class a particular case belongs.

Early cases will require only the initial dose of antitoxin, 1,000 units. The disease is promptly arrested and its natural course cut short. In such cases the patient is generally found quite well on the third or fourth day, and no sequelæ or complications will be observed. The conditions found are as nearly those of experimental diphtheria as is possible in clinical practice and accordingly the full specific powers of the remedy are obtained. In a series of early cases the physician's work becomes a matter of simple routine. He administers the requisite dose of antitoxin, orders a mild aperient and directs that the nose and throat be kept clean with a mild antiseptic or alkalin. Other remedies are not needed, and frequently it is difficult to keep the little patient in bed. If one will review his work as compared with his experience in the disease before the introduction of antitoxin, he is tempted to pronounce such cases of mild type and probably so conclude that many of the cases would have recovered without specific treatment. Bearing in mind, however, the gravity of any diphtheritic infection and the natural tendency of the disease, it is safe to declare that of a given number of cases treated with antitoxin early, less than 1 per cent. would have terminated in complete recovery within four days if treated otherwise; while according to the best pre-antitoxin statistics, between 25 and 30 per cent. would have died. On the other hand the 70 to 75 per cent. that would have recovered would have run courses ranging from ten days to three weeks and been attended by both sequelæ and complications. This applies to all cases treated early whether the type of the disease is pharyngeal or laryngeal. Cases treated early with antitoxin are universally mild because treated early; and remain mild because treated scientifically and specifically.

Late cases usually require more than one dose of antitoxin. The conditions to be met are graver and less easily appreciated than in early cases. In addition to the primary lesion there is the secondary or constitutional lesion. The pathologic condition from being purely local has become widely disseminated throughout many and important organs of the body. The toxins absorbed from the pseudomembrane have caused the essential lesion of the disease or scattered centers of cell necrosis. From these centers arises a new element of danger. The way in which this is caused is clearly indicated in the following from Louis Fisher: "If large quantities of this so-called membrane-toxin are absorbed into the system through neglected or delayed treatment, these toxins transform the albuminoid bodies of the tissues and cause tissue poisons or tissue toxins. These tissue toxins can be classed as those that belong to digested proteids, and those that are not proteid substances. The first is an albumose; the second is an organic acid. Albumoses have a specific action on the human organism: when present in large quantities they produce fever, and if allowed to act for any length of time they produce paralysis. In very large quantities they produce great exhaustion and also fatty degeneration of the heart and kidneys. It is in these cases that antitoxin at times fail, owing to the presence of poisons other than those peculiar to pseudomembrane, and which are by-products of degenerative changes in the tissues."

In late cases then the condition is that of primary

diphtheria for which antitoxin is fully specific, plus the damage already done and its grave constitutional results. The cases seen late are frequently of mixed infection, streptococci or other pathogenic organisms having followed upon the diphtheritic infection.

The local lesion soon becomes gangrenous and the constitutional condition, that of approaching pyemia. To this must be added in a certain percentage of cases the effects of pre-existing disease, either manifest or latent. While it is now largely conceded that antitoxin exerts specific power in neutralizing the membrane toxins and arresting the primary infecting process, it is not known to have such action against the tissue toxins, and certainly will not restore the integrity of damaged organs. In these cases the danger from the disease *per se*, is not so great as that from the damage already sustained by vital organs. The former is much more promptly amenable to treatment than the latter.

In treatment every feature must be kept in view. As early as possible the primary infecting process must be removed. It is impossible to form an adequate estimate of the number of antitoxic units required to accomplish this. The symptoms hyperemia, stupor, coma, or certain physical signs, the appearance, condition and extent of the pseudomembrane, the rapidity of spread may indicate a high degree of toxemia and mark the case as one of great malignancy, but all these form no basis for estimation. The condition must be met by special dosage. In these severe cases give 2,000 units of antitoxin and repeat the dose in eight to ten hours if the desired effects are not obtained. The full neutralizing effects of a dose of antitoxin are secured on absorption of the serum and within ten hours. To wait a longer time before repeating the dose is to expose the tissues of the body to further damage from the unneutralized toxins. Too much importance can not be attached to the use of concentrated serum. The smaller bulk is more promptly absorbed and results can be confidently expected in a much shorter time than when weak serums are employed. When this rule is followed I find comparatively few late cases require more than two doses. Late cases are always to be regarded as in imminent danger. Any undue effort or excitement on the part of the patient may induce cardiac paralysis. The patient's strength must be husbanded by quiet, the recumbent posture and nutritious food. To tax the heart as little as possible I have the foot of the bed slightly elevated. To these measures must be added, in many cases, cardiac and general tonics and stimulants. Such cases always run a more prolonged course and are often attended by complications and sequelæ. Though the disease proper is cured by the entire removal of the primary infecting process, the damage already sustained is sufficient to carry the disease process through a fixed course with the above named results.

Since introducing the serum treatment of diphtheria into my practice in January, 1895, I have employed it in sixty cases with a loss of five. In all these cases, excepting a few seen in consultation with other physicians, the diagnosis was confirmed by laboratory culture. They embrace all types and all degrees of malignancy and include a number of cases seen quite late in the disease. My earliest experience was with the French product, but since a most excellent antitoxin has been furnished by a reliable Philadelphia firm I have used this exclusively. My first eighteen cases were treated in the West Jersey Orphanage and all recovered. These have been under my observation ever since and are in perfect health to this day. My results with the treatment have been entirely satisfactory in every particular, so that my former dread of meeting diphtheria cases has entirely left me. My only anxiety now is to see the cases reasonably early.

When I hear a physician question the value of antitoxin in the prevention and cure of diphtheria, or what is more in the face of the volume of testimonies now in its favor openly oppose antitoxin, my conclusions are that he has never used it or seen it used; or if the contrary is true, that a reliable product was not employed or was employed improperly. Antitoxin is not employed scientifically when the physician delays in order to first know whether the patient will most likely die without it, or to have his diagnosis confirmed by a culture before inaugurating the serum treatment; or when employed it is given in too small doses and at too long intervals.

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STREPTOCOCCIC INFECTION AND MARMOREK'S SERUM.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-eighth Annual Meeting of the American Medical Association held at Philadelphia, June 1-4, 1897.

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The study of bacteriology during the past few years has developed many interesting facts, not alone to the scientist, whose labors and interests are confined to the laboratory, but also to the clinician, whose work it is to practically apply the knowledge furnished him by the former. It would be difficult to name any one branch of the subject which could justly claim precedence if viewed merely in its scientific aspect, for all are of absorbing interest in this regard; but in the matter of practical application and tangible results it may be safely asserted that the study of the streptococcus microbe stands first in the list. It is the most widely distributed of any of the members of its class; it is more variable in its morphologic development than any of the others; it is unique in the matter of biologic characteristics, and it is decidedly the most far-reaching in its pathogenic effects. Unlike any of its congeners its mere presence does not signify a single specific operation, but may be the harbinger of one of several conditions that vary widely in their effects on living tissues. Thus the microbe is found alone or associated with other micro-organisms in such diseases as erysipelas, puerperal septicemia, diphtheria, scarlatina, bronchitis, bronchopneumonia, septic wounds, gangrene, salpingitis, otitis, appendicitis and many others, as well as on the mucous surface of the natural orifices of the body in individuals who appear to be free from disease of any kind.

The very fact of the presence of this germ in such a large number of diseases and conditions of dissimilar character makes it difficult to attribute to it any certain and fixed pathology; while on the other hand this seeming confliction of testimony readily accounts for the wide diversity of opinion that exists between various observers as to its nature and effects.

It does not come within the scope of this paper to treat of the history, morphology, biologic characteristics and pathogenesis of this germ, for these are all

lucidly taught in various text-books; but rather to deal with the practical side of the question of what to do with the little mischief-maker when we have found it. In passing, however, we may state that it belongs to the facultative anaerobic group—living both in the presence and absence of oxygen—and, according to Sternberg, is a spherical coccus from four-tenths to one micro-millimeter in diameter on the average, but varying considerably in size. It multiplies by binary division, forming chains of various lengths by the adherence of the elements to each other, and making one of the most attractive fields to be seen in the bacterial world. The germ grows readily, but somewhat slowly, in nearly all kinds of media, solid, semi-solid and liquid, and multiplies in temperatures ranging from 16 to 60 degrees C., but most readily between 30 and 37 degrees C. It stains readily with the aniline colors, and also by Gram's method. For the best inspection a magnifying power of about 1000 diameters is required. It shows beautifully under a one-twelfth inch immersion lens.

While we have here a microbe that is easy to cultivate and easy to preserve, it is with much satisfaction that we can confidently assert that it is also easy to destroy. It succumbs to the influence of appropriate treatment with such alacrity that but a few days were required to completely annihilate it in any of the tests that have come under my personal observation.

It may be true that Méry, as mentioned in the *Bulletin Médical* (France), April 22, 1896, isolated a chain microbe from a malarial fever patient which resisted the antistreptococcus serum; but may it not also be true that the serum used for the test was stale, attenuated or otherwise unfit for use? Such instances are so very rare that they should not be permitted to stand against the thousands of successful trials, and be used as an argument against the serum; but should rather be regarded as accidents or the results of faulty experimentation.

It will be noticed that we speak of the streptococcus in the singular number, thereby indicating a belief in the unity of this form of germ. Such is the opinion held by several of the most careful investigators; and while more than a dozen different species of streptococci have been described by various observers, we think it has been quite clearly shown by the researches of Marmorek and Widal that they are all so closely related as to be the offspring of a single parent microbe.

The difference in size, form and effects may be accounted for by the widely different conditions under which they have been cultivated. All have noticed the difference between cultures made in artificial and natural media, and even between those made in natural media of different origin. In the cultivation of the streptococcus it was early noticed that in some instances the chains were long, forming immense and fanciful loops, and exceedingly virulent in character. In others the chains were short, straight and comparatively innocuous, leading to the belief that the virulence was in direct proportion to the length of the chains. This theory, however, was soon exploded, as it was found that by inoculations of the same cultures into rabbits and mice, the resulting chains would be long in the former and short in the latter, while the virulence would remain the same in both. It was these widely varying results, obtained by untiring zeal in the prosecution of innumerable experiments, that led Marmorek to the belief in the unity of the streptococcic germ. In his interesting report of his work in this line, published in the *Annales de l'Institut Pasteur*, July, 1895, he sums up in these words: "Our experience confirms the opinion of those who regard all streptococcic affections of man as due to one sole microbe."

Having settled in his own mind the question of the character of the germ, Marmorek began the task of making a serum for its destruction. In this work every facility was afforded him by Professor Roux, who placed all needed appliances at his disposal, while wise counsel and encouragement were constantly furnished by his old friend and colleague, Dr. Metchnikoff.

Others had been engaged in this work before the young Austrian was ever heard of in the world of science, special importance attaching to the researches of Roger, Behring, Mironoff and Lingelsheim. These investigators succeeded in establishing many points of interest in connection with the development and effects of the germ itself, and even prepared a serum that was partially successful in destroying it. However, they never succeeded in procuring a serum of sufficient potency to effectually act upon the severer forms of the infection. A good and sufficient reason for this failure will be suggested in the following division of this subject, namely:

The serum.—Like all blood serums, antitoxins and products of like character, the antistreptococcus serum requires time, skill and experience for its proper manufacture. A lack of one or more of these factors has undoubtedly led to the production of inferior serums, and consequently to failure and disappointment in their use. It has been clearly demonstrated that "laboratory serums," such as were formerly made by using the usual selection of members of the rodent family are so attenuated as to be almost inert. Such animals do not seem to be able to resist the toxic effect of repeated injections, and hence the serum procured from them is not of sufficient potency to act with much if any effect upon the germs. This seems to have been the difficulty with the serums made by the four pioneer manufacturers already alluded to. They deserve all praise for their foresight and for pointing the way which eventually led to such a great achievement by another. Their work was a triumph, but their patience gave out, their enthusiasm abated, their faith relaxed, or for some other reason they abandoned a noble cause and left a half finished task to be completed and gloriously crowned by that indefatigable worker, Alexander Marmorek. This great investigator may be said to have commenced where the others left off. He began to use larger animals in his experiments and at once noticed a decided improvement in the serum. First he utilized the sheep, then the ass and finally the horse, when the ideal seemed to be reached. This animal tolerates the toxin remarkably well and yields by far the largest quantity of serum of any yet tried; hence it is the one now exclusively used by Marmorek in the preparation of his serum. Not only is it necessary to exercise good judgment in the selection of animals, but it is even of greater importance to properly care for them during their treatment, and especially to avoid a too early withdrawal of the blood. The process of manufacture is necessarily a slow one and the utmost patience is required for its accomplishment. Not only must oft repeated injections be made to insure the proper degree of potency, but even after the animal is known to be

thoroughly immunized and after the last injection is made several weeks must be allowed to elapse before the blood is withdrawn, as during the reaction the blood is actually toxic and if injected into rabbits during this time will invariably kill them in from five to ten days. On the other hand, if allowed to remain until the reaction has ceased it may be used upon these animals with impunity. This discovery constitutes one of the notable features in the great work of Marmorek, whose enduring patience enabled him to accomplish so much and without which the world would yet be in all probability without an effective and reliable streptococcic remedy.

Marmorek has shown that the serum is effective in exact proportion to the amount of toxin received by the animal. He has also demonstrated that the serum as manufactured by him, although the strongest of any yet made as regards the toxic action on the microbe, is incapable of working injury to the human organism. This feature he attributes to the great care taken in its manufacture. Like all the blood serums made at the Pasteur laboratories in Paris, it is entirely without antiseptics. It is claimed by Roux that his vast experience in the manufacture of antitoxins and serums has taught him that antiseptics can do no possible good and are capable of doing a great deal of harm. The serums are not preserved by the antiseptics, as is popularly supposed; they will only keep a certain length of time; they must be kept at a proper temperature in order to retain their activity, and if so kept, will remain potent as long without antiseptics as with them. Made without antiseptics there is scarcely any limit to the dosage, as the toxic symptoms following injections are always due to these so-called preservatives or other impurities, and not to anything that is inherent in a pure blood serum.

A very conservative and fair-minded editorial appeared in the *Medical News*, April 24, 1897, concerning the uses of this serum, and while the editor rendered a verdict of "not proven" in regard to the various claims made for it, he more than offsets this verdict by his honest admission of what may occur under favorable conditions. He mentions the harmlessness of a pure serum, notes that only one case of kidney involvement has so far been attributed to its use, and admits that no one is in a position to say that the disease itself (septic infection) was not responsible for the renal involvement. He goes on to state that "our apparent lack of success up to the present time may be due to the *imperfect* or *insufficient* administration of the serum." He advises the use of Marmorek's serum in connection with appropriate surgical measures, warning his readers to "utilize a serum obtained from a reliable source and free from extraneous substances, such as carbolic acid," on the ground that such a product is "hardly likely to do harm, and may do a world of good."

Therapy.—By far the most important division of this subject is the one which treats of clinical data. In this we can speak with greater confidence, notwithstanding the fact that we are occasionally confronted by theoretic clashings which tend to make our position at first glance appear somewhat paradoxic. For example, an ordinary acute abscess seems to bear very little resemblance to a case of erysipelas, especially a case of erysipelas in which suppuration does not occur; and yet it is admitted on all hands that the pathogenic germs of these two affections are identical, one being the "streptococcus erysipelatis" of Fehleisen (1883) and the other the "streptococcus pyogenes" described by Rosenbach (1884) and Passet (1885). Again, puerperal septicemia caused by streptococcic infection and chronic inflammation of the middle ear, do not seem to stand in very close relation to each other, and neither of them would ordinarily be placed in the same class with either of the two diseases just mentioned; and yet we have in all of them the same pathogenic force at work, and all of them readily yield to the same line of treatment.

It would be impossible to enumerate all the diseases in which the streptococcus figures, either as the principal or as a complication, for the simple reason that in all probability not a tenth of them are known; but it is sufficient for us to know that wherever and whenever found it is a danger signal of weighty import, and that immediate steps should be taken for its destruction. It is no argument to say that because certain so-called "kinds" or "species" of the germ are harmless we would ever be justified in waiting for a demonstration of their virulence. If the deductions of Widal, Marmorek and others who believe in the unity of the germ are correct, the most benign of them may, by change of conditions, soon become the most virulent.

In order that I may not be misquoted or misunderstood, I wish to distinctly state that the antistreptococcus serum is only recommended for streptococcic infection, and not for diseases or conditions in which this infection does not exist. Some cases of puerperal septicemia are caused by the bacillus coli communis, and in the treatment of these the serum would be without effect. But in the greater number of cases chains of streptococci are found in large numbers, and these yield to the serum treatment in a most remarkable manner. Hence we emphasize the necessity of a bacteriologic examination in every suspected or doubtful case, in order that treatment may be pursued upon rational and scientific lines. As a general rule there is ample time for thus settling the question of diagnosis before treatment is begun; but in occasional instances where the gravity of the case would render delay dangerous we would advise yielding to empiricism to the extent of administering at least one efficient dose of the serum without waiting for the bacteriologic test, knowing that in any event no harm would follow, while, as has frequently been the case, it might be the means of saving a human life.

When we say that erysipelas may be aborted by the use of this remedy, we speak from authority furnished by the case-books of reputable physicians. To say that it can always be aborted would probably be a flagrant error; but that it may always be modified, ameliorated and abridged is the almost universal verdict of the profession of two hemispheres. If its value as a therapeutic agent had to be measured by its power over one such disease as puerperal septicemia, it would doubtless retain its place in the list of valuable remedies for all time to come. But such is not the case. We already have such an overwhelming array of proof of its efficacy in a number of apparently diverse conditions as to lead to the belief that it will soon be esteemed as the most valuable of the blood serums yet discovered. Besides the diseases already mentioned, in which it may be relied on to effect a cure with little or no other treatment, it has been used with remarkable sucess in many cases of mixed infection, removing with great promptness an ugly complication and rendering a disease amenable to ordinary treatment, which

would otherwise have resulted fatally. Among such diseases may be mentioned diphtheria, scarlet fever, bronchitis, bronchopneumonia and phthisis pulmonalis. In the last named it has been especially useful, as will appear in the report of cases to follow.

It is claimed by several observers that, no matter what the disease may be, the use of the serum is always followed by increased leucocytosis. If this be true, and the army of fighting phagocytes can be recruited at will, what mind can foretell the future, even the near future, of this infant that we designate sero-therapy? It is already one of the recognized branches of legitimate medicine in the old world, and is rapidly gaining in popularity here. The diphtheria antitoxin is no longer an experiment with us, and considering that the Marmorek serum was only introduced into the United States less than a year ago, its success in this country must be regarded as little less than phenomenal.

Reports of cases.—In France, where the serum has been used most extensively, the weight of evidence is vastly in its favor. True, it has been severely criticised in a few instances, but a careful study of such cases has generally resulted in victory, rather than defeat, for the serum. They have almost invariably been cases of mixed infection in which the serum was expected to exhibit powers not attributed to it by its discoverer, and, very generally too, when it was given in *inadequate doses*. In some instances, too, where adverse opinions were expressed, an admittedly weak or doubtfully prepared serum was used. Thus in the *Botkins* (Russia) *Clinical Gazette*, No. 43, 1896, we find a report of sixteen cases of scarlet fever treated by Dr. L. Rappoport, in all of which a serum was used. This series of cases he divides into three groups, as follows: Four of "medium gravity," two "severe," and ten cases "with various complications." The serum employed was of Russian manufacture, and admitted to be much weaker than Marmorek's; and as 20 c.c. was the maximum dose given in any one case, it seems but natural that some of the cases should die "without," to quote Dr. Rappoport, "the serum having had any apparent effect upon their course." Very different from this report is the one of Dr. Rondot, made at the meeting of the French Medical Congress held at Nancy, France, Aug. 6, 1896. In this report Dr. Rondot gives his experience with Marmorek's serum in the treatment of a large number of cases of erysipelas. He invariably found that the serum produced a rapid improvement in the general condition, and marked reduction of temperature and diminution in the duration and gravity of the disease. In the most severe cases there was always rapid and pronounced retrocession in the acuteness of the lesions.

At the meeting of the Ophthalmologic Society of France, Nov 3, 1896, Dr. Boucheron related his successful use of Mamorek's serum in the treatment of purulent dacryocystitis and other cases of streptococcic infection of the eyes. He, in common with Widmark, Morax and others had noticed that many cases of dacryocystitis were caused by the streptococcus, and that they were always of a well defined type. The most rebellious of these are those that he specially commends for the serum treatment. Boucheron also found that this serum could be successfully used as a preventive of streptococcic infection of the ocular organs at the time of operation for cataract or ocular traumatism.

Drs. Vahle, Steffek, Döderlein and Walthard all found the streptococcus present in the vaginal secretions of such a large proportion of pregnant and parturient women that Dr. Vahle arrived at the conclusion that before every accouchement, even in healthy subjects, prophylactic injections of the serum should be made. (*Zeit. für Gebur. und Gynec.*, Vol. 35, No. 2.)

At a meeting of the Medical Scientific Society of Lyons, France, Dr. Vinay reported thirteen cases of puerperal fever treated with Marmorek's serum, nine of which were eminently successful. This is not a record to be ashamed of; but it is highly probable that with more extended experience in the technique of administering the serum since these cases were reported, the percentage of recoveries would be considerably increased in a similar series at this time.

In the London *Practitioner*, April 1897, Mr. Watson Cheyne reports three cases of prophylactic injections of the serum in removal of malignant disease about the tongue and upper part of the pharynx, cases which are so generally followed by septic infection. No such infection followed in any of these cases, two recovering with no unpleasant sequelæ and one dying from cerebral embolism.

The *British Medical Journal*, Oct. 31, 1896, contained a report from Dr. J. I. Williams of fourteen cases of severe puerperal septicemia treated with Marmorek's serum. Twelve (86 per cent.) of these made excellent recoveries, and in the other two it was admitted that treatment had been too long delayed.

Dr. Lainsbury, at Royal Free Hospital, London (*Lancet*, Oct. 10, 1896), reports a case of malignant endocarditis cured by the use of 70 c.c. of the serum, the beginning dose being 20 c.c.

Dr. Sevestre, in charge of the diphtheria patients in the Sick Children's Hospital, Paris, uses Marmorek's serum freely in all cases of mixed infection, with excellent results, the proportion of recoveries being considerably augmented since the employment of this remedy.

M. Cuffer reports a remarkable recovery after the use of twenty-eight vials of the serum extending over a period of one month. The case was one of endocarditis, pericarditis, congestion of the lungs with pleurisy, arthritis and endometritis. He also reports a case of acute pelvic inflammation in which the left broad ligament was infiltrated forming a very large tumor. Injections of serum prevented the formation of pus in the tumor and all unpleasant symptoms rapidly disappeared.

Dr. Chantemesse of Paris, had remarkable success in the treatment of 411 cases of erysipelas in which he used the serum. In every instance the symptoms were most favorably influenced by the treatment; and after deducting three cases which were absolutely hopeless on account of complications, the recoveries were 99 3 per cent.

But it is not necessary to remain on the other side of the Atlantic in order to find reports favorable to this line of treatment, and I have so far done so principally to show the wide range of application of the serum. Coming home, then, we begin the report of cases by mentioning some that are characterized as "unsuccessful." In this list one of the most interesting is the series of six cases reported by Dr. R. F. Wier at the New York Academy of Medicine, and published in the *Medical Record*, May 1, 1897. Antistreptococcus serum was used in all of the six cases, and according to the report, "with no apparent benefit." Accord-

ing to the *Record*, a brief analysis of these cases is as follows:

Case 1.—Tuberculous ileo-lumbar abscess. On the fifth day after opening *streptococci* and *staphylococci* were found. Serum used. No benefit.

Case 2.—Chronic tubercular ostitis of the femur; after operation *staphylococci* were found, but no *streptococci*. Serum used. No benefit.

Case 3.—Carcinoma of the breast; amputation of the gland. Does not state whether streptococci were found. Serum used. No benefit. Death.

Case 4.—Compound fracture of the femur involving the knee joint; suppuration; amputation. Serum used. No improvement. The report does not state whether or not streptococci were found.

Case 5.—General extensive purulent peritonitis from appendicitis. Serum used. No benefit. Death. Does not mention the presence or absence of streptococci.

Case 6.—Perforative appendicitis with general suppurative peritonitis. In this case "the only effect of the serum was on the pulse."

It is difficult to understand why six such cases as these should be reported as an argument against antistreptococcus serum. Cases 5 and 6 would almost necessarily terminate fatally under any line of treatment; cases 3 and 4 might reasonably be expected to succumb to the surgical operation and systemic infection, while in case 2 it is admitted that none of the germs (streptococci) were found, for which alone this serum is recommended.

Dr. Lilienthal, in discussing Dr. Wier's paper, mentioned that his experience had been most favorable, and that the eight cases in which he had used the serum had led him to predict a great future for it.

Dr. Van Arsdale, also of New York, reported two interesting cases, one of appendicitis with general purulent peritonitis, and the other gangrene of the gall bladder accompanied by seropurulent peritonitis. Both were extremely grave, but under appropriate surgical measures coupled with the use of the serum, recovered.

Dr. Henry W. Berg of the Willard Parker Hospital, has reported so many instances of the successful use of the serum in cases of diphtheria and scarlatina where there was mixed infection, that his experience must be familiar to most practitioners and it is therefore only necessary to mention it here.

The *Medical Record*, March 14, 1896, and the *Medical News*, April 4, 1896, both give glowing accounts of the efficacy of Marmorek's serum in the complications and sequelæ of scarlet fever. Adenitis, otitis and albuminuria are among the complications mentioned by these authorities, and all of them were speedily controlled by the serum.

Prof. E. E. Montgomery (JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, Aug. 1, 1896), advises the early use of the serum in puerperal septicemia in daily doses of 20 c.c.

Dr. Howard Lilienthal (*Medical Record*, March 20, 1897), reports a case of a child supposed to be suffering from rheumatism of the hip joint. The doctor opened an abscess, found chains of streptococci, and used the serum with success.

Dr. Gerster corroborated Dr. Lilienthal and said he had used the serum in a number of cases at Mt. Sinai Hospital, including such diseases as peritonitis, appendicitis and general sepsis, and all with excellent results, some of the recoveries being regarded as marvelous. Dr. Richards in the same journal reports the successful use of the serum in a case of puerperal septicemia in which the prognosis was very bad.

Reasoning from analogy it may be supposed that the gynecologist will find in Marmorek's serum a sheet-anchor in his specialty. He finds pus everywhere. It confronts him in the reproductive tract from the ovary to the ostium vaginæ, and is one of his most dreaded enemies in the connective tissue throughout the pelvic cavity. It can not be possible that all of these are of gonorrheal origin. Many of them must be sequelæ of simple congestions brought about by innocent and unavoidable causes. If Marmorek's serum controls this condition when applied in the congestive stage in other localities, why not also in this hotbed of abscesses? We believe it will do so if intelligently employed, and we believe also that laparotomy, so frequently resorted to in the past may often be rendered unnecessary by this simple and easy means.

In conclusion we will refer to the use of Marmorek's serum in cases of tuberculosis, having purposely reserved mention of this disease till the last on account of its vast importance. A little more than a year ago Dr. Chas. T. McClintock of Ann Arbor read a paper before the Michigan State Medical Society, in which he predicted that the antistreptococcic serum would find its greatest usefulness in cases of tuberculosis. That was the first published utterance to this effect, and Dr. McClintock has proved himself a prophet. During the month of July, 1896, Dr. W. H. Weaver of Chicago used Marmorek's serum in three such cases, reporting them in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, Sept. 5, 1896. That was the first published report of cases treated in this way. Since that time a number of cases have been so treated by physicians in different parts of the country, but little or nothing has been published concerning them. Why, it would be difficult to say. The importance of the subject would seem to merit more attention than it has received. In all the published reports, however, and in all received from private sources, there has been a pleasing unanimity in the action of the serum. Without exception it has done all that was expected of it. That is to say, it has invariably destroyed the streptococcus microbe and thus freed the case from a disagreeable and dangerous complication. Having thus converted the case from one of mixed infection into one of simple tuberculosis, the system is left in better condition to resist the ravages of the tubercle bacillus, and consequently more likely to respond to appropriate treatment for the destruction of this germ. The serum should be used in those cases only where the bacteriologic test shows the presence of the streptococcus microbe. In all such cases there is liable to be considerable cough, purulent expectoration, night sweats, high temperature, insomnia and anorexia, all of which are greatly modified and sometimes disappear altogether under the influence of the antistreptococcus serum. Oftentimes the train of symptoms just enumerated will be found where there is no streptococcic infection. These, as a rule, are very grave cases and the serum treatment is not indicated. Lack of space forbids a detailed account of the progress of the different cases in which the serum has been used; but suffice to say that while some of them were hopeless as far as ultimate recovery was concerned, yet without exception there was such decided amelioration of distressing symptoms as to lead to the conclusion that earlier employment of the serum would at least have resulted in greatly prolonging life.

Dosage.—Marmorek's serum should always be used

by hypodermic injection into the cellular tissue. If due antiseptic precautions are observed and ordinary skill used in its administration, it is free from danger, and the dose is practically without limit.

In all grave cases, such as puerperal septicemia, and especially if treatment has been considerably delayed, an initial dose of 30 c.c. is advised. This may be followed by doses of 10 c.c. or 20 c.c. every twelve or twenty-four hours, according as the symptoms are affected.

In ordinary cases of erysipelas the initial dose is 20 c.c., and in many instances may be all that is required. However, it may be repeated once or twice in twenty-four hours if necessary. In the complications of diphtheria and scarlet fever one dose of 10 c.c. will be found sufficient in the vast majority of cases. In the mixed infection of tuberculosis, the dose should ordinarily be 10 c.c., to be repeated every second or third day until the microbes have disappeared from the sputum, usually requiring from four to six injections.

In all other affections, such as acute abscesses, pelvic inflammations, chronic inflammation of the middle ear, and in suppurative processes generally where the streptococcus germ is found, the dose must be regulated according to the exigencies of the case.

Children bear the serum remarkably well, and 10 c.c. is the usual dose for children of all ages.

Almost any part of the body where the skin is not tightly drawn may be selected for the injections. In adults preference has usually been given to the lumbar or gluteal regions; while in children the lower abdomen, a little to the right or left of the median line, is more frequently selected. A perfectly sterile syringe and needle should be used; and unless some special condition exists to call for more thorough cleansing, the site may be sufficiently prepared by a careful bathing in alcohol.

Conclusions.—1. In Marmorek's serum we have a remedy of the greatest therapeutic value. 2. So far as known, it is only applicable to streptococcic infection, simple or mixed, hence it naturally follows that, 3. An early bacteriologic examination should be made in order to settle the question of diagnosis and point the treatment. 4. Its action upon the microbe is rapid and certain if given in adequate doses.

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DISCUSSION.

Dr. FLAGG—I would ask where this serum can be obtained in this country; also whether in order to use it the physician must make bacteriologic examinations and cultures in every case.

Dr. AMES—I was impressed, while listening to this paper, by its possibilities in the treatment of tuberculosis. I would ask whether or not Dr. Cox can refer to any other reports of its use besides his own work in the treatment of tuberculosis? I would suggest that a combination of the nuclein with the streptococcic serum might be suitable in the later stages of tuberculosis.

Dr. COX—The remedy can be obtained at the agency for the Pasteur Institute (the Pasteur Vaccine Co.) in Chicago. There is no work on the subject that I know of except this communication I have just read.

Dr. HILL—I have been using antistreptococcic serum for some time. I think that an idea, suggested by Dr. Cox, to have an examination made when possible in order to settle the value of the remedy, is a good one. In other words, do not condemn a remedy without being scientific in your treatment. In many cases the laboratory examination is unnecessary, and the clinical diagnosis is quite sufficient. For instance, in erysipelas and in puerperal septicemia, you have a perfect illustration of streptococcus infection. You can not make a mistake in diagnosis. In these cases, it has never failed me.

Dr. Cox—In closing the discussion, I must express my delight at witnessing the interest shown by the members of the Section in the subject of serotherapy. I am glad that I have been able to correct some false impressions growing out of the indiscriminate use of serums of uncertain value. In reply to the question as to the necessity of making bacteriologic tests in every case, it is stated in the paper that this should always be done when practicable, always excepting cases where delays would be dangerous. The experience of the chairman is in keeping with that of other careful observers, viz., the rapid destruction of the streptococcus germs. It is to be hoped that those especially interested in the study of that dread disease, tuberculosis, will be on the lookout for complications caused by this germ and direct their treatment accordingly. I desire to emphasize this request, inasmuch as the subject is of such vital importance to the race.

CLASSIFICATION AND SURGICAL TREATMENT OF ACUTE PERITONITIS.

Read by invitation in the General Session of the International Medical Congress, at Moscow, Russia, Aug. 20, 1897.

BY N. SENN, M.D., PH.D., LL.D.
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(*Concluded from page 463.*)

Methods of drainage.—At present there are three methods of drainage in general use: 1. Tubular drainage. 2. Capillary drainage. 3. A combination of tubular and capillary drainage. All of these methods have their advocates and are applicable under certain circumstances. No one method of drainage will answer in all cases.

Tubular drainage.—Tubular drainage is specially indicated in cases in which the abdominal cavity contains pus. The tubes employed are made either of glass or soft rubber. Keith's glass drains answer an excellent purpose in draining the lowest portion of the abdominal cavity. They should be slightly curved at the abdominal end so as to reach the floor of the pelvic cavity without making harmful pressure against the bladder. Frequent aspiration of the contents of the drain is necessary for the purpose of removing the fluid inflammatory product as soon as it is formed. The rubber drain answers the same purpose, but is properly accused of causing more mechanical irritation than the smooth glass tube. Prolonged tubular drainage has not infrequently caused intestinal fistula by pressure. It is for this reason that I now almost invariably surround the rubber or glass tube with a few layers of iodoform gauze securely fastened to the tube. In draining the pelvic portion of the abdominal cavity I frequently use two drains the size of the little finger, one on each side brought out through the same opening in the lower angle of the wound. In draining in the lumbar regions and through the vagina rubber drains should be employed.

Capillary drainage.—Capillary drains are frequently employed as substitutes for the tubular drains and in addition must often be relied on as an important hemostatic resource in arresting parenchymatous oozing. Iodoform or sterilized gauze are usually employed as capillary drains in draining the abdominal cavity for peritonitis. Bardenheuer first resorted to strips of iodoform gauze in draining the peritoneal cavity. The greatest objections to this method of drainage are the danger from iodoform poisoning if a considerable quantity of gauze is used, the difficulty of removing the gauze, and the likelihood of a ventral hernia as a legacy. The name of Mikulicz is connected with a special method of gauze drainage of his own device, familiarly known as the Mikulicz iodoform gauze tampon or drain, which has proved of the greatest value in abdominal operations

and in the surgical treatment of peritonitis. The typical Mikulicz tampon is made by taking a piece of iodoform gauze the size of a large handkerchief, to the center of which a strong piece of aseptic silk thread is stitched. When used it is arranged as a pouch and is carried by means of a curved forceps to the bottom of the pelvis and is filled with strips of iodoform gauze, the free end of the silk thread issuing from the mouth of the pouch. When it is desired to remove the drain the gauze strips are removed and the pouch removed by making traction upon the string. I must, however, take issue with Mikulicz and his immediate followers. He speaks of an iodoform gauze drain, and any surgeon who has had considerable experience in abdominal surgery can testify to the fact that where the Mikulicz drain is called for we are frequently dealing with large cavities requiring an enormous amount of gauze. It is in such cases that I have learned to fear iodoform gauze, because the cases are by no means isolated in which a gauze drain composed exclusively of iodoform gauze became the immediate cause of death from iodoform intoxication. This is particulary liable to occur in cases in which the patient's kidneys are not functionating properly, or are diseased. It is in dealing with this class of cases that the elimination of iodoform is accomplished with great difficulty, and hence when accumulation occurs death is liable to follow from intoxication. Again, there are persons that are extremely susceptible to the local and general toxic effects of iodoform. A very small quantity of this substance may prove fatal from intoxication. I should, therefore, in using the Mikulicz drain limit the iodoform gauze to an outer layer or two and pack the pouch with ordinary sterilized gauze. This advice I am sure you will all appreciate. Drainage by using sterilized wicking has been popular in Germany for a number of years, and in many cases has answered an excellent purpose. It has never found its way to any extent into America, where gauze is employed in preference. A most excellent method of securing capillary drainage has been described by R. T. Morris (JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, July 25, 1892). To avoid the danger of hard and soft tubes and of unprotected gauze he recommends wicks, which he employs in a peculiar way. The simplest wick consists of a little roll of absorbent bichlorid gauze, around which is wrapped a couple of thicknesses of Lister's protective silk. The gauze protrudes a little from each end of the cylinder, and a few small fenestræ in the protective silk allow the serum to reach the gauze elsewhere. In certain cases where injections through a tube are desirable, the soft tube can be surrounded by this wick. When a large gauze packing for the pelvis or abdomen is needed, an apron of the silk can expand over the gauze and protect against intestinal adhesions. This method of drainage possesses great advantages over ordinary tubular and capillary drainage as heretofore described and recommends itself more especially in the surgical treatment of diffuse septic peritonitis. The prolonged contact of gauze with a serous surface is very prone to give rise to permanent adhesions as every clinician knows. In employing gauze in draining the peritoneal cavity, it is necessary to use long strips which should be inserted some distance in different directions and brought out at the same place and fastened together with a safety-pin. Van Hook has shown by his experiments that the gauze drains more freely if the external ends of the strips are left long and placed on the side of the pelvis below the level of the wound. Drainage must be dispensep with as soon as possible in order to prevent adhesions and to enable the surgeon to close the incision by secondary suturing, an important precaution against the formation of a ventral hernia. The strips should be shortened and one after the other removed as the indications for drainage disappear.

Combined tubular and capillary drainage.—The simultaneous use of a tubular and capillary drain is an excellent method of securing drainage. It is made by packing loosely a glass drain of proper length and size with strips of gauze or aseptic wicking. This manner of drainage is especially useful when the inflammatory product is serum instead of pus. It does away with the annoyance and risks of removing the transudate at frequent intervals, as is necessary in the employment of simple tubular drainage. If it is the design of the surgeon to resort to frequent irrigation after the operation, tubular drainage is necessary, but to this can be added capillary drainage by inserting strips of gauze into localities that would not be reached by the irrigating fluid.

Intra-intestinal saline injections—The value of saline cathartics in the treatment of peritonitis in its early stages not caused by perforation and after operations for peritonitis is now generally recognized. One of the difficulties encountered in the treatment of such cases is the intolerance of the stomach to food and medicines. A. J. McCosh has succeeded in securing free catharsis and in overcoming the intestinal paresis after operations for peritonitis by injecting into the intestine saline cathartics in concentrated solution. ("The Treatment of General Septic Peritonitis," *Annals of Surgery*, June, 1897.) He claims that since he has resorted to this additional procedure his results have been greatly improved. Sulphate of magnesia is injected through a hollow needle attached to a large aspirating syringe, into the small intestine, at a point in the jejunum or in the ileum as high up as possible. A saturated solution containing between one and two ounces of the salt is used. The needle puncture is closed by a Lembert suture. This suggestion certainly appears rational and should receive a fair trial by the profession.

After-treatment.—In all cases of general septic peritonitis subjected to operative treatment the most attentive and careful after-treatment is essential to success. All such patients are prostrated from the effects of the disease and the immediate effects of the operation and require a stimulating treatment. External dry heat is an important element in counteracting the direct effects of the shock caused by the operation and in restoring the peripheral circulation. The distressing thirst is quenched most effectually by the administration of water by subcutaneous infusion or rectal enemata. Strychnia and alcoholic stimulants are best calculated to increase the force of the heart's action and the tone of the arterial circulation. Partial inversion of the body by raising the foot of the bed and autotransfusion are potent means of inducing cardiac stimulation. A well-fitting abdominal bandage applied firmly exerts a favorable influence in preventing and diminishing abdominal distension. As long as nausea and vomiting persist main reliance must be placed on rectal feeding. Saline cathartics should be administered as soon as the stomach is in a condition to absorb them. Meteorism can often be

relieved by high turpentine enemata and the use of the elastic rectal tube. As no operation ever secures complete asepticity of the peritoneal cavity in cases of general peritonitis, Marmorek's anti-streptococcus toxin may prove a useful adjunct to the after-treatment.

A number of cases have recently been reported in which the serum appears to have been of great value in the treatment of septic conditions in the peritoneal cavity and elsewhere. It is not probable that the serum treatment will ever displace the knife in the treatment of diffuse general septic peritonitis, but it is more than probable that it will prove to be an important therapeutic agent in the treatment of peritonitis before and after operation. Opium should be used with great caution in the after-treatment, as it is liable to cause intestinal paresis and thus increase the danger from auto-intoxication. If the peritoneal cavity has been drained with gauze the external dressing should be changed as soon as it has become saturated. The same course of treatment is to be pursued if the combined tubular and capillary drain has been used. In cases in which tubular drainage has been established the surgeon usually intends to follow the operation by continuous or periodic irrigation. If continuous irrigation is decided on the normal salt solution is the one usually employed. The solution should be used at a temperature of 105 degrees F.; the current should be small and without much force. The outflow from the peritoneal cavity should be received upon a rubber blanket and the necessary provision made to conduct it into a receptacle near the patient's bed. This method of irrigation recommends itself particularly in cases of diffuse septic peritonitis. In suppurative diffuse peritonitis periodic flushings, repeated at intervals of two or three hours, will prove of value in removing from the peritoneal cavity the fluid products of the inflammatory process. The solutions best adapted for this purpose are a saturated solution of the acetate of aluminium, a 3 to 5 per cent. solution of boracic acid or Thiersch's solution. Between the flushings the wound and openings of the drains are covered with the usual hygroscopic aseptic dressings to receive the discharge and to prevent secondary mixed infection with putrefactive bacilli. Drainage when once established should be suspended gradually and not suddenly. As soon as the peritoneal cavity and the drain canals are aseptic the external wound should be sutured to prevent as far as possible the subsequent formation of a ventral hernia.

3. PERFORATIVE PERITONITIS.—Perforation of the abdominal wall or of any of the abdominal organs containing septic material may give rise to general or circumscribed peritonitis; large visceral perforations usually result in general septic peritonitis, small perforations are preceded by visceral adhesions which limit the extension of the infection and inflammation and end in circumscribed peritonitis. Perforative peritonitis invariably occurs as a secondary affection, usually in connection with an ulcerative or gangrenous lesion of any part of the gastro-intestinal canal. Perforating ulcer of the stomach, duodenum, or typhoid or tubercular ulcers of the ileum, perforation or sloughing of the appendix vermiformis, the different forms of intestinal obstruction, are the most frequent causes of this well-defined clinical form of peritonitis. Penetrating wounds of the abdomen with visceral injury of the gastro-intestinal canal must be regarded in the same light as perforative lesions of the abdominal organs in the causation of peritonitis, and should hence be classified under this head from a bacteriologic as well as anatomico-pathologic standpoint. Perforative peritonitis is manifested by the sudden onset of the disease, by diffuse pain and tenderness, rigid abdominal walls, fever, vomiting, the impossibility by inspection, palpation and auscultation to ascertain intestinal peristalsis, the latter being almost positive proof of the presence of gas in the free peritoneal cavity. According to the author's observations, peritoneal meteorism in perforative peritonitis caused by appendicitis is rare, while he has seldom found it absent in perforations of any other portion of the gastro-intestinal canal. According to the number and virulence of the microbes which find their way into the peritoneal cavity with the extravasation, the resulting peritonitis is either diffuse or more or less circumscribed. The colon bacillus is invariably present in the inflammatory product, but in addition streptococci, staphylococci, putrefactive bacilli, the typhoid bacillus, or bacillus of tuberculosis, according to the nature of the primary affection, may also be found. Perforative peritonitis must be regarded and treated as a strictly surgical disease. The primary lesion must be exposed and treated as soon as a diagnosis can be made and the necessary measures applied to limit the extension of the infection and to prevent death from toxemia. The perforation should be found and properly treated before a general septic peritonitis has had time to develop. There are exceptions to this rule in cases where the perforation is small and the extravasation has produced a limited peritonitis in a locality where it is safe to wait for abscess formation, as is often the case in the region of the gall bladder and appendix vermiformis. Penetrating wounds of the abdomen with visceral lesions of sufficient extent to give rise to extravasation should be subjected at once to treatment by laparotomy. If at the time the operation is performed peritonitis has set in, this must receive proper attention after the visceral wounds have received the necessary treatment.

Perforating gastric ulcer.—Perforating ulcer of the stomach is found most frequently on the anterior wall of the stomach near the small curvature. According to Brinton, in 85 per cent. of all cases the anterior wall of the stomach is the seat of the perforation. Perforation in this locality is followed more constantly by diffuse peritonitis than if the posterior wall is the seat of ulceration and perforation. In seventy-five cases of perforating ulceration of the anterior wall of the stomach collected by Eichhorst, in sixty-four the perforation was complete, whereas in thirty cases at the cardiac extremity, escape of contents into the peritoneal cavity occurred but twelve times. When perforation of the ulcer into the free peritoneal cavity takes place the onset of the disease is always sudden, no matter what the antecedent symptoms may have been. Shock is present in greater or less degree. Vomiting, though frequent, is not constant. Abdominal pain and tenderness increased by pressure are nearly always present; abdominal rigidity in the early stage, and distension later on, are frequently noted. The duration of the cases vary from a few hours to five days, most of them terminating in death in less than twenty-four hours.

Treatment.—Mikulicz performed the first operation for this condition in 1883. The first successful case was reported by Kriege of Berlin. The incision should be made in the median line from the ensiform cartilage to the umbilicus, and enlarged if necessary. A

long incision is required if the operation is performed after peritonitis has developed. In such cases suprapubic and epi-umbilical drainage is required after suturing of the perforation, and free flushing of the abdominal cavity is indicated. If the posterior wall is perforated and the perforation can not be reached in the usual manner, the anterior wall is incised and the perforation closed through the incision, after which the incision is sutured and the peritoneal cavity cleansed and the external wound closed if the peritoneal cavity has not become infected. Before suturing the perforation the stomach should be emptied through a stomach-tube or through the opening before suturing the perforation. It is not necessary to excise the margins of the ulcer, as these can be inverted in tying the Lembert sutures. Should the wall of the stomach in the immediate vicinity of the ulcer present an unfavorable condition for successful suturing, an omental flap or graft of requisite size should be sewed with catgut over the line of suturing.

Barling ("Perforation of Gastric Ulcer." *British Med. Jour.*, June 15, 1896) operates after the symptoms of shock have subsided. According to his experience, the prognosis is best if the operation is performed as soon as possible after the accident has occurred. In nine successful cases, collected by this author, the operation was made on an average seven and three-fourth hours after the perforation occurred, shortest interval three hours, longest ten hours. In fifteen cases which died, the average time was twenty-seven hours, the shortest interval four, the longest seventy hours. Perforation of the posterior wall of the stomach frequently gives rise to a subdiaphragmatic abscess, and when the disease resulting from the perforation has reached this stage, it must be treated in accordance with the rules that will be laid down in discussing this subject later on.

Perforating ulcer of the duodenum.—Much that has been said concerning perforating ulcer of the stomach applies to the same pathologic condition of the duodenum. The perforation occurs suddenly and frequently without any marked premonitory symptoms indicative of the existence of the primary disease. The direction in which the extravasation takes place depends on the location of the ulcer. Perforation into the free peritoneal cavity before any adhesions have taken place results in diffuse and rapidly fatal peritonitis. If perforation takes place into the lesser peritoneal cavity, circumscribed suppurative peritonitis is caused, which occasionally terminates in the formation of a subdiaphragmatic abscess.

Treatment.—It is only recently that peritonitis resulting from this cause has been subjected to operative treatment. Percy Dean, in 1894, performed the first successful operation. Grieg Smith advises incision over the seat of perforation; that is, if the condition is suspected. If we follow this rule the incision will be above the umbilicus and through the right rectus muscle. The ulcer is usually in the first part, but may be in either of the other two portions. In order to expose the lesser omental cavity we must split the gastrocolic omentum in part. The ulcer is simply inverted, excision being unnecessary. Drainage must always be provided for.

Perforating typhoid ulcer. — Perforation of a typhoid ulcer, large enough for extravasation to take place into the free peritoneal cavity, is a fatal accident, death ensuing in the course of a day or two. Perforation, however, does not always terminate in that way. Extravasation is often prevented by the affected part of the intestinal wall becoming attached to an adjoining serous surface, thus protecting the peritoneal cavity against infection. I have seen several cases of typhoid fever in which about the time that perforation is most likely to occur circumscribed peritonitis set in, which could only have been caused by a perforating ulcer under such favorable conditions, and from which the patients recovered without operative intervention.

Treatment and results.—Kussmaul was the first to perform laparotomy, excise and suture a perforating typhoid ulcer. The operation was performed October 1885. Luecke (*Deutsche Zeitschrift f. Chirurgie*, 1888) reports a case in which he performed laparotomy for the same indication Oct. 22, 1885. A large perforation was found, excised, and the edges sutured. The abdominal cavity was washed out with salicylated water, the wound sutured except a space left for a large tubular drain. The patient died in seven hours. A pint of fluid with a fecal odor was found in the pelvic cavity. Luecke in connection with the report of this case suggested the performance of the operation in two stages, the perforated intestine to be fastened to the abdominal wall in the wound in the first, and the direct treatment of the perforation later. The following three years the operation was performed by Bontecou, Bartlett and T. G. Morton with no recoveries. Van Hook (*Medical News*, Vol. 50, No. 217) reports three cases treated by laparotomy and suturing of the perforation, of which one recovered. He collected nineteen cases of which four recovered. He places the line of sutures parallel to the long axis of the bowel and flushes the peritoneal cavity with a thick stream of sterilized salt solution at a temperature 105 to 112 degrees F.

Wiggin (*Medical Press*, Jan. 1, 1896) collected twenty-four cases of perforating typhoid ulcer subjected to laparotomy with six recoveries. If those cases are rejected in which the diagnosis is somewhat doubtful, there are seventeen patients with three recoveries. The first successful result was obtained by Van Hook, the second by Netschajans, the third by Abbe. J. Price has recently reported three consecutive operations with as many recoveries, a surgical feat which it will be difficult to duplicate. The writer has performed the operation three times with one recovery. The feasibility and justifiability of abdominal section for perforating the typhoid fluid ulcer have been established in view of the fact that all of the patients who have been operated on would have died without the operation. The operation should be performed as soon as possible after the accident has occurred. The mortality will always remain great owing to the debilitated condition of the patients and the existence of multiple ulcers. The incision is made through the median line between umbilicus and pubes and at least large enough to insert a hand. The first point to be sought for is the ileocecal region, when search is made for the perforation in an upward direction replacing the part of the bowel examined so as to prevent extensive eventration. Excision of the ulcer is unnecessary as its margins can be inverted by the Lembert stitches which should be placed transversely and not in the long axis of the bowel as advised by Van Hook. Should the serous surface over any other ulcer present indications of an approaching perforation it should be covered with an omental flap or graft fastened in place with a few points of catgut suture.

Flushing of the abdominal cavity with a warm physiologic solution of salt followed with Thiersch's solution and free drainage are strongly indicated and should invariably be carried out. If the patient is much prostrated, Luecke's suggestion to perform the operation in two stages should receive serious consideration. If the perforation has resulted in circumscribed suppurative peritonitis, incision and drainage of the abscess cavity are indicated, leaving the perforation to heal spontaneously or to be closed by a subsequent operation.

4. CIRCUMSCRIBED PERITONITIS.—A circumscribed peritonitis is an inflammation of the peritoneum during which a greater or lesser part of the peritoneal cavity becomes excluded from the original source of infection by the formation of plastic visceral, parietal, or visceral and parietal adhesions. The complexus of symptoms varies according to the degree of virulence of the microbic cause, which only occasionally is overshadowed by the primary affection. The symptoms appear suddenly, or are preceded by those incident to the primary disease. The severity of the pain and the extent of muscular rigidity and tenderness will correspond with the extent of the disease. The intensity of the general symptoms are determined more by the nature and virulence of the microbic cause than the area of the peritoneal surface involved. The inflammatory focus may be limited to a very small space, or it may involve the greater portion of the peritoneal cavity and organs which it contains. The clinical course and termination are determined largely by the nature of the bacterial cause, the anatomic location of the primary starting point and nature of the environment. Localized peritonitis is most likely to occur outside of the limits of the small intestine area. If the organs adjacent to the primary focus of infection are favorably located to limitation of the process, diffusion is frequently prevented by the formation of adhesions. This is especially true in cases where the primary infection is limited by the existence of old adhesions. Localized peritonitis may be confined to the lesser omental cavity, particularly in cases of perforating ulcer of the stomach and duodenum. More frequently it is caused by appendicitis and cecitis. A very frequent cause of circumscribed peritonitis is inflammation about the gall blader, uterus, Falliopian tubes and ovaries. The localized form of peritonitis is very often overlooked during life. It can usually only be detected if a demonstrable swelling forms at the seat of inflammation. The mildest form of infection gives rise to fibrinoplastic peritonitis which leaves temporary or permanent adhesions, but terminates without suppuration. Circumscribed suppurative inflammation is always attended by fibrinoplastic peritonitis the products of which and the viscera which it involves form the abscess wall. The microbes which most frequently produce fibrinoplastic peritonitis without suppuration are the gonococcus and staphylococci. Circumscribed suppurative peritonitis is usually the result of infection with staphylococci, bacillus coli communis and pneumococci. In fibrinoplastic peritonitis surgical interference only becomes necessary when intestinal obstruction is caused by adhesions. In circumscribed suppurative peritonitis the pus should be evacuated as soon as the disease is recognized and if possible by an extraperitoneal route.

Acute tubercular peritonitis.—Tubercular peritonitis met with in the majority of cases in the circumscribed form occasionally presents itself as a widely diffused acute affection. The rapid diffusion in the peritoneal cavity, either through the circulation or by rupture of a tubercular abscess into the peritoneal cavity, or by extension from a tubercular salpingitis, occasionally gives rise to a form of acute peritonitis characterized as such in a modified way by the clinical manifestations which accompany it. According to the intensity of the infection or the degree of susceptibility of the patient to the action of the tubercle bacillus, the disease assumes one of the following pathologic forms: 1. Tubercular ascites. 2. Fibrinoplastic peritonitis. 3. Adhesive peritonitis. Suppuration only takes place when the tubercular product becomes the seat of a secondary mixed infection with pus microbes. Laparotomy is now a well established operation in tubercular peritonitis. The exact manner in which the operation exerts its therapeutic influence is not well understood.

Nannotti and Baciocchi (Hildebrand, *Jahresbericht f. Chirurgie*, 1896, p. 661) studied the curative effect of incision and drainage for peritoneal tuberculosis experimentally produced on rabbits and dogs. The operation yielded only temporary improvement in rabbits, but usually resulted in a permanent cure in dogs. They found, soon after the operation, a decided local reaction in the periphery of the tubercle nodules, an increased phagocytosis which in dogs brought about absorption of the tubercular product and formation of new connective tissue. Irrigation of the peritoneal cavity did not appear to add to the therapeutic effect of the operation. According to these investigators, the curative influence of the operation is to be attributed to the local reaction which it induces, and by increasing the absorptive power of the peritoneum. The writer has obtained very satisfactory results in cases which resisted laparotomy and drainage by repeated tappings and injections of two to four drachms of a 10 per cent. iodoform glycerin emulsion.

Suppurative peritonitis.—Suppurative peritonitis, *i. e.*, an inflammation of the peritoneum which results in the formation of pus, is always more or less circumscribed. This form of peritonitis is most frequent and is generally associated with fibrinoplastic exudation. The pus is either serous, seropurulent, or may reach the consistence of cream, when it is usually of a yellow color. The accumulation of pus may be so large that upon opening the abdomen it may appear as though the entire peritoneal cavity and all of the organs contained within were implicated, but a careful examination will almost always reveal the fact that a large part of the peritoneal cavity and many of the organs were shut out from the inflammatory process by plastic adhesions. Suppurative peritonitis must therefore be regarded from a practical standpoint as a circumscribed inflammation. The appearance and character of the pus are often greatly modified by the admixture of an extravasation accompanying the perforative lesion which produced the peritonitis. If the pus is thin, serous, we speak of a seropurulent peritonitis. It is a serous peritonitis with the formation of pus in sufficient quantity to render the serum more or less turbid. This subvariety of suppurative peritonitis is without exception in combination with fibrinous exudations which tend to limit the extension of the infective process. Sedimentation of the solid constituents takes place, so that the fluid contains more of the solid matter in the most dependent portion of the affected district.

Fibrinoplastic peritonitis.—A very frequent form of circumscribed peritonitis is the one in which the inflammatory exudate is composed largely of fibrin—fibrinoplastic peritonitis. It is usually a secondary process following a primary affection of one of the abdominal or pelvic organs, and denotes a mild form of infection the extension of which becomes limited by firm adhesions. The inflammation results in plastic exudation with little or no effusion. The character of the exudate depends on the intensity and quality of the bacterial cause. The exudation is often so copious that it has been mistaken for malignant disease. The distinguishing features of this form of peritonitis from abdominal tumor are less circumscribed outline, the lesser resistance offered, the more regular surface and the fact that ascitic fluid is not bloody, but serous or seropurulent. The exudation in the course of time contracts and results in strong bands of adhesion which frequently flex and distort the organs to which they are attached, which has given rise to another term, *peritonitis deformans.*

Treatment.—The surgical treatment of circumscribed peritonitis by abdominal section has yielded very encouraging results. In many of these cases the surgeon is able to reach the abscess and gain access to the primary lesion without invading the peritoneal cavity. In such instances the operation is an *oncotomy* and should be distinguished from the operation in which the free peritoneal cavity must be invaded to reach the pus cavity, which is then an *abdominal section* in the sense in which this expression is used in surgical language. The extraperitoneal route is the operation of choice in all cases in which the abscess cavity can be safely reached and efficiently drained by this method. In circumscribed accumulations of pus in the peritoneal cavity, in which the seat of the disease must be reached through the free abdominal cavity, the safest course to pursue is to perform the operation in two stages. The first operation then consists in suturing the parietal peritoneum to the wall of the abscess cavity, suturing the abdominal incision with the exception of a space large enough to incise and drain the abscess cavity later. This space is packed with iodoform gauze, and two or three days later the abscess is incised and drained. If the symptoms are urgent and the operation must be completed, the contents of the abscess cavity should be removed by aspiration, after which the suturing can be more thoroughly done, when the abscess can be incised and drained with less risk of infecting the peritonal cavity than without preliminary evacuation by the use of the aspirator. These methods of treatment are especially applicable for single pus cavities. If the disease is more diffuse, involving a number of abdominal organs, and the abdominal incision reaches at once the infected territory, pus wherever found must be removed by flushing or by mopping with a soft sponge. In fibrinoplastic peritonitis without suppuration, no attempt should be made to tear the adhesions except they have caused intestinal obstruction, when the new surfaces are dusted with aristol, which, as has been shown by the experiments and clinical observations of R. T. Morris, is the most efficient way to prevent recurrence of the adhesions.

Witzel ("Ueber die Erfolge der chirurgischen Behandlung der diffusen eitrigen Peritonitis und peritonealen Sepsis," *Deutsche Med. Wochenschrift*, No. 40, 1888) admits that in cases of peritoneal sepsis, the most acute and gravest form of infection, surgical treatment is of no avail. In general and circumscribed suppurative peritonitis operative treatment is indicated. Eventration and removal of the pus with sponges are not permissible, as animals thus treated invariably died. Experiments on animals as well as clinical observation satisfied Witzel that multiple incisions, drainage and irrigation with salt solution proved successful in thoroughly cleansing the peritoneal cavity without causing shock.

Mikulicz (*Centralblatt f. Chirurgie*, No. 29, 1889) advises that in progressive fibropurulent peritonitis the adhesions should not be disturbed, and each abscess should be evacuated separately in order to prevent fresh infection from the liberated contents of these encapsulated foci of infection. In one case six intraperitoneal abscesses were evacuated through as many incisions at four consecutive operations. The diagnostic indications of such abscesses are increased resistance, tenderness, dulness and elevated temperature. In cases of doubt an exploratory puncture should be made. The abscess cavities should be drained with iodoform gauze. Some surgeons pursue a more aggressive course and are not content in removing the fluid pathologic product, but aim to remove at the same time the fibrinous exudate. At the meeting of the French Surgical Congress ("Transactions," 1890) Demons made a strong plea in favor of early operative intervention and the removal of fibrinous deposits. In 1883 he had under his care a woman suffering from suppurative peritonitis following suppuration of an ovarian cyst. Her condition at the time of operation was critical. He opened the abdomen, evacuated the pus, removed the cyst, and with a rough sponge and blade of a knife scraped the entire surface of the intestine; a most satisfactory recovery followed. He deemed it advisable to scrape the inflamed surfaces as more efficacious and affording less risk of missing portions of the exudates. In a similar case he assisted Denucé in performing this radical method of cleansing, and the patient rapidly recovered. There are few surgeons who would today follow his example. Adhesions tend to limit the infective process, and should be interfered with as little as possible in the search and liberation of pus.

Körte ("Erfahrungen über die chirurgische Behandlung der allgemeinen eitrigen Bauchfellentzündung," *Arch. f. Klinische Chirurgie*, B. 44, p. 612) saved six out of nineteen cases of acute general suppurative peritonitis treated by abdominal section. All cases without adhesions and peritoneal sepsis died, also all cases operated upon after the fourth day. He cautions not to separate adhesions and is content in evacuating the pus and establishing drainage. The closure of perforations should be left unless it can be done without additional risk.

5. Hematogenous Peritonitis.—The existence of primary peritonitis without an antecedent intra-abdominal direct source of infection is looked upon with suspicion by most modern pathologists and surgeons. Idiopathic peritonitis so-called, or hematogenous peritonitis, does occur, but is much more rare than similar affections of the pleura and pericardium. As a primary affection peritonitis is found most frequently in females during or soon after menstruation. It is probable that the pyogenic bacteria multiply in the blood which accumulates in the uterus, and reach the peritoneal cavity through the Fallopian tubes. As peritonitis is always caused by bacteria of some kind, a peritonitis that develops independently of a local

source of infection is the result of an infection through the blood, and should be called hematogenous or metastatic peritonitis. It has been observed in connection with nephritis, pyemia, rheumatic arthritis and acute exanthematous diseases. In the absence of even a distant focus of infection it is plausible to assume that peritonitis in very rare cases is caused by the localization of pus microbes derived from the circulating blood in some part of the peritoneum prepared for their reception and growth by some antecedent disease or injury. In primary peritonitis the disease is not preceded by any symptoms which would suggest the existence of an antecedent disease or injury. Hematogenous peritonitis assumes different pathologic types, resembling in this respect peritonitis produced by direct local causes.

Treatment.—The surgical treatment must be guided by the location and extent of the disease, the existence or absence of complications, and the pathologic type the disease presents at the time of operation. The absence of primary visceral disease of any of the abdominal organs is a favorable item in the prognosis and in the technique of the operation to be performed in the surgical treatment of this form of peritonitis.

6. VISCERAL PERITONITIS.—A localized peritonitis that can be brought in direct etiologic connection with the organ primarily affected is expressed by a compound word, with the prefix *peri* and the noun used to indicate the organ primarily affected in a state of inflammation. The inflammatory process is seldom limited to a single organ, as during the course of the disease adjacent organs or the parietal peritoneum will surely become involved. The nomenclature of visceral peritonitis is a lengthy one, as it includes all of the abdominal and pelvic organs from which, when the seat of a suppurative inflammation, may come the primary starting point of an attack of localized or diffuse peritonitis. The mesentery and omentum are modified forms of the peritoneum, and when the seat of inflammation we speak of a mesenteritis and epiploitis. In inflammatory and traumatic affections of the abdominal walls and the abdominal and pelvic viscera, plastic inflammation of the omentum frequently constitutes the safeguard against infection of the general peritoneal cavity by the omentum becoming firmly attached over a threatened perforation or visceral or parietal wound, thus affording protection against infection from within and without. On the other hand such adhesions between the different abdominal viscera, and the viscera and any portion of the abdominal wall are often transformed into firm bands of adhesions which later on so frequently become a direct cause of intestinal obstruction. The surgeon often imitates nature's process and makes use of the omentum in covering denuded surfaces or in suturing tissues of doubtful resistance, and in coving surfaces of the gastro-intestinal canal the seat of a threatened perforation. In visceral peritonitis the primary disease often furnishes the special indication for which the operation is performed. Inflammation of the gall bladder often gives rise to inflammation of the serous investment of a number of adjacent organs resulting in succession in pericystitis, epiploitis, perigastritis, perihepatitis and peri-enteritis. The removal of the original cause which provoked the primary disease furnishes the main indication in the treatment of such extensive pathologic indications. The surgical treatment of appendicitis and its various complications is not well settled at the present time. Some surgeons advise operation in all cases in which a diagnosis of appendicitis can be made, regardless of the nature of the disease and the character of its complications. The more conservative element of the profession limit the use of the knife to cases in which there are positive indications for surgical interference. For my own part I resort to operation in all cases, during a first attack, when the symptoms point to perforation or gangrene of the appendix. The sooner the operation is undertaken under such circumstances the better the results. The appendix should only be sought for and removed if pus is found in the iliac fossa, when this can be done without a material increase in the immediate risks of the operation, otherwise the treatment by incision and drainage will yield the best results. In mild cases of appendicitis, from 80 to 90 per cent. recover under appropriate medical treatment, and in a fair percentage of cases the disease does not return. The gravest cases are those in which the affection of the appendix is followed by diffuse peritonitis. In the treatment of this class of cases nearly all surgeons are fully in accord with the rules laid down by McBurney (*Medical Record*, No. 13, 1895). This surgeon reports twenty-four cases of diffuse peritonitis caused by appendicitis treated by abdominal section, of which number fourteen recovered. He prefers glass tubes to rubber drains. The glass tube is loosely packed with sterile gauze and inserted to the floor of the pelvis. He irrigates with a hot sterile salt solution. The incision, four to six inches in length, is made from a point near the anterior superior spine of the ilium following the direction of Poupart's ligament and about an inch above it. Adhesions are interfered with as little as possible. Collections of pus or seropurulent fluid are searched for and evacuated. After removal of pus with sponges, irrigation is practiced. If fluid is found outside of the pelvis, strips of iodoform gauze are used to drain the different spaces. At the end of twenty-four to thirty-six hours the glass drain is removed and a strip of gauze inserted in its place. If the clinical history reveals the fact that during the first or any subsequent attack an abscess in the vicinity of the appendix has ruptured into the cecum, I should hesitate to recommend an operation, as such cases usually recover spontaneously in the course of time, an operation for such a condition is attended by many and serious risks. The writer has operated in four cases, in which the balance of what remained of the appendix was removed, the opening in the cecum sutured, two of which recovered and two died of septic peritonitis within three days after the operation. In relapsing appendicitis an operation is indicated, particularly in cases in which the attacks set in at short intervals and with gradually increasing intensity.

In peritonitis resulting from infective lesions of the female internal genital organs, the uterus, ovaries and Fallopian tubes, the organ primarily affected and the resulting intraperitoneal abscess can often be reached more safely by a vaginal than by an abdominal operation. Occasionally the combined operation will afford greater safety, more complete removal of the infected tissues and organs, and more efficient drainage.

7. PELVIC PERITONITIS.—Pelvic peritonitis is seldom met with in the male. It is a form of peritonitis in which the female pelvic organs are the primary starting point of infection with extension to the periton-

eum, either through the Fallopian tubes, or the lymphatics of the uterus or its adnexa. It is caused most frequently by gonorrheal or puerperal infection, or develops after instrumental examination of the interior of the uterus or operations upon this organ. In pyogenic infection the inflammation may become diffuse, and if circumscribed usually leads to the formation of parametritic or intraperitoneal abscesses, or pus formation takes place in both of these localities. In the peritoneal cavity the gonococcus produces a plastic peritonitis, and sometimes localized suppuration. Salpingoperitonitis and more diffuse pelvic peritonitis are most frequently caused by gonococcus infection. Ceppi (*Revue Méd. de la Suisse Romande*, 1888) reported the first case of laparotomy for gonorrheal peritonitis. Gonococci were found in the pus cells. The patient recovered. Abdominal section is seldom performed for gonorrheal peritonitis during the acute stage. Opening of the abdominal cavity by this route is usually reserved for the removal of the remote consequences of the disease, and the operation usually includes the removal of the adnexa on one or both sides. An early incision through the vaginal roof into the *cul-de-sac* of Douglas in the treatment of pelvic peritonitis, so strongly urged and frequently practiced by Henrotin, is a rational procedure and frequently succeeds in preventing the extension of the infection, and the occurrence of serious remote complications. I have in several instances incised and drained the Fallopian tube through such an incision, and in this way prevented further leakage from the tube into the peritoneal cavity, and thus directly cut off additional supply of infectious material. The treatment of large parametritic abscesses extending to the brim of the pelvis and above it by making an extraperitoneal incision the same as is resorted to in ligating the external iliac artery, a procedure advocated by Pozzi, is preferable to a transperitoneal operation in all cases in which the abscess can be reached by this route.

Birnbaum (*Der Frauenarzt*, July 7, 1894) advises in puerperal sepsis in which a pelvic exudate has been thrown out, if continued high fever persists, drainage of the abcess as required. When fluctuation is detected an incision is made from 1 to 2 centimeters above Poupart's ligament and from 2 to 3 centimeters from the anterior superior iliac spine. When fluctuation is not positive exploratory puncture is recommended; vaginal exploration and incision are indicated when the abscess is located lower down in the pelvis. We shall hear less of intestinal, vesical and rectal fistula in the future, as the remote results of pelvic peritonitis or parametritic abscesses, as soon as the profession recognizes fully the importance and necessity of timely operative interference.

8. Puerperal Peritonitis.—By the term puerperal peritonitis is understood a progressive inflammation of the peritoneum occurring in consequence of an extension of an infection from any part of the genital tract in puerperal women after delivery or abortion. The infection usually takes place through the lymphatics, which in the majority of cases terminates in diffuse septic peritonitis. In some instances the disease remains limited to the pelvic organs and their serous investment, when abscess formation intra- and extra-peritoneal is very likely to occur. The infection in such comparatively mild forms of puerperal sepsis is usually caused by the different varieties of the staphylococcus while the diffuse septic puerperal peritonitis is nearly always produced by the streptococcus.

Treatment.—The treatment of the localized form of puerperal peritonitis is the same as that we have advised in circumscribed peritonitis resulting from other causes. The foudroyant form of puerperal sepsis proves fatal in spite of the most energetic medical and surgical treatment. The use of the antistreptococcus serum may prove of great value and should receive an early and fair trial. It has been suggested that early removal of the infected uterus would prevent the extension of the disease to the peritoneum and death from sepsis. A number of vaginal hysterectomies have been performed for this indication, but on the whole the results have not been encouraging. It is exceedingly difficult, and in many cases absolutely impossible, to make a sufficiently early and positive diagnosis to warrant such a grave and mutilating operation as a timely and life-saving measure. If the uterus is removed after general septic peritonitis has developed, the operation is performed too late, and death from shock and sepsis is the rule. Professor von Winckel ("Ueber die Kölotomie bei der diffusen, eitrigen puerperalen Peritonitis," *Therapeut. Monatschefte*, Heft 4, 1895), is not in favor of resorting at once to the removal of the uterus and adnexa by the vaginal route. In cases in which the Douglas *cul-de-sac* is prominent in the vagina, he recommends a broad and free incision behind the uterus. If the inflammatory product is not within safe reach of a vaginal incision he advises abdominal section. He is in favor of vaginal hysterectomy only in cases in which a double parametritis sets in after such a procedure.

9. Subdiaphragmatic Peritonitis.—A peritonitis limited to the under surface of the diaphragm and any of the adjacent abdominal organs is called subdiaphragmatic peritonitis. If the inflammation remains limited and life is sufficiently prolonged, it usually terminates in the formation of a subdiaphragmatic or subphrenic abscess. Perforating ulcer of the stomach and duodenum, abscess of the spleen and liver, are the most frequent affections which precede subdiaphragmatic peritonitis. Maydl has wrtiten the most complete treatise on subphrenic abscesses, dividing them into twelve groups according to their location and the organ from which they have their starting point. The diagnosis is usually difficult and Maydl recommends the exploring needle very strongly as an important diagnostic resource. The abscess often ruptures into the pleural cavity. The abscess is most frequently reached through the pleural cavity, which is sometimes found obliterated where the puncture and incision are made through the diaphragm. In cases of empyema of the pleural cavity the possible existance of a subphrenic abscess must be kept in mind.

Witthauer ("Über Magenperforation and subphrenische Abscesse," *Therapeut. Monatshefte*, October, 1895), reports two cases of subphrenic abscess caused by perforation of the stomach, which terminated fatally without operation. In the first case carcinoma of the stomach was diagnosticated, in the second the diagnosis was first made of perforating ulcer of the stomach but was later doubted, as the usual symptoms of peritonitis did not appear. A similar case is reported by Schesinger. Trojanow (*Annalen der russ. Chirurgen*, 1896, Heft 3) reports a case of subphrenic abscess which had its starting point in a splenic infarct which occurred during an attack of typhoid fever. He resected the tenth rib between the axillary

line and scapula, found the pleural cavity at that point obliterated, and at once incised the diaphragm, opened and drained the abscess, in the contents of which fragments of necrosed splenic tissue were found. In cases in which the pleural cavity is not found obliterated, he advises suturing of the pleura to the diaphragm before opening the abscess. A valuable contribution to the statistics and surgery of subphrenic abscesses has recently been made by C. Beck of New York (*Medical Record*, Feb. 15, 1896). He reports five cases treated successfully by operative interference. Rib resection and opening of the pleural cavity usually become necessary as preliminary steps in opening a subphrenic abscess. Accurate location of the abscess and a positive diagnosis are made by exploratory puncture. As perforating ulcer of the stomach is the most frequent cause, subphrenic abscesses are more frequently located on the left than the right side. Occasionally a spontaneous cure occurs by perforation of the abscess into a hollow adjacent organ. Maydl has shown that out of 104 cases not operated on only six recovered, while out of eighteen cases operated on only 11 per cent. died. The satisfactory results of the operation furnish the most conclusive proof regarding its necessity and life-saving value.

SURGERY ONE HUNDRED YEARS AGO.

AN HISTORICAL STUDY

BY DR. GEORGE FISCHER.

DEDICATED TO THE GERMAN SURGICAL ASSOCIATION.

TRANSLATED FOR THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION BY CARL H. VON KLEIN, A.M., M.D.

(*Continued from page 484.*)

XII.—FRENCH AND ENGLISH WAR SURGERY.

The beginning of the French war surgery; The first flying and stationary hospitals; Improvements under Louis XIV. and XV.; Organization of war hospitals and military physicians under Louis XVI. and the Republic; Means of transportation; Ravaton, Colombier; Trecourt, Lombard, Percy, Moreau, Boy; English regulations; the lash; J. Hunter, Jackson; J. Pringle, fresh air, recreation of the sick; Brocklesby, barracks; Count Stair, treaty for the protection of the wounded; French and German voices concerning barracks and protection treaty.

From the downfall of the Roman Empire to the time of the crusades one hears nothing of military surgery; it was dormant and awakened first in *France*. When Louis the Good made a pilgrimage to the Holy Land, Pitard was the first surgeon who accompanied the army with a few others, almost all monks or priests who along with their clerical functions also gave medical treatment. The later generations troubled themselves but little over the care of the wounded warriors. For their personal attendance alone, the kings, barons and generals took surgeons with them to the war, and these also occasionally treated the officers for a compensation, but they were never obliged to do so. The common soldier was left to the quacks who preyed on the army with their wound balsam and secret remedies. Women established themselves on the battlefields; they adjusted bandages and washed out wounds. Such was the condition in France and everywhere. Although through the introduction of shotguns, a great change took place as well as in the manner of fighting, which was no longer between individuals but between large masses, as in the kind of injuries sustained, and the number of wounded was enormously increased; still military physicians were never appointed. Ambroise Paré, who during the war from 1536 to 1569, although in the service of only a single prince, first extended his help in a large measure to the wounded soldiers, can therefore be regarded as the first qualified military surgeon. How great respect this surgeon enjoyed in the French army was shown in the hard-pressed fortunes of Metz, whose completely discouraged garrison felt that his arrival was the greatest reinforcement which they could receive. His king, Charles IX., saved him to the Reformists on the night of St. Bartholomew.

The great confidence which the troops felt in him and in his pupil Pigray, who, placed under similar circumstances, had never refused his assistance to the soldiers, was the inducement which moved Henry IV. to organize the military medical system. In 1591 the king issued a decree for the care of the wounded, and in 1597, at the siege Amiens by Sully, he established the *first portable hospital* with a surgeon-major at the head. This new creation was christened by the French with the new name "ambulance," a word which had not before appeared in their language. Under Louis XIII., besides the portable hospitals (Hôp. ambulant), which followed the army, there arose also *fixed military hospitals* (Hôp. sédentaire, the first one at Pignerol), of which Cardinal Richelieu regarded himself as the founder. To each regiment a surgeon-major was now appointed. The wars of *Louis XIV.* made new improvements necessary. The king increased the number of stationary and portable hospitals as well as the number of physicians. He appointed to the ambulances and to each regiment, subordinate to their chief, an over-surgeon (chirurgien-major), under-surgeons (sous-aide-major), assistant surgeons (aide-major chirurgien) and students. With all of these a surgeon-major was provided for consultation.

Under Louis XV. institutions for the training of military physicians were first established, and by him and his successor repeated decrees were issued for the better organization of the sanitary system. France led all other countries and served as an example to them. They opened the amphitheaters in Lille, Metz and Strassburg, and erected two new ones in Brest and Toulon, where for the education of skilful physicians medicine and surgery, together with the supplementary sciences, were taught. In order to learn the nature of a field-hospital under Louis XV., we may consider the plans of Ravaton, at that time military surgeon. A field-hospital for 20,000 men should have an able surgeon-major at its head who should in every case be chosen from the military hospitals; also twelve chirurgiens aides-major, and thirty students who should be chosen only according to merit and not by favor, and thirty attendants. There should be in addition a war commissary, director, sub-director, cook, butcher, baker and three priests, so that the whole field-hospital includes 134 persons and forty-six horses. They carried crucifixes and all the accessories with which to celebrate mass; there were also six complete surgical instrument chests, six tackles, 1,000 pieces of bandage cloth, ten centners of lint, 10,000 strong needles, etc. In the enormous store of medicines there were, among other things, 200 pounds of licorice, 150 pounds of senna, 200 pounds of turpentine, 200 pounds of manna, 400 pounds of eau de vie de France, 100 pounds of olive oil and 150 pounds of ungt. basilicum. Ravaton assumed that in the beginning of a campaign 3 per cent of the troops would be sick; in the middle of the campaign 5 or 6 per cent.; and at the end from 10 to 12 per cent.; while after a

battle which had raged from morning till evening, he assumed that 10 per cent. of the troops would be wounded.

Under Louis XVI. each army had a consulting surgeon, whose advice was sought when new field-hospitals were laid out, in important surgical cases and in all scientific questions. On the other hand the surgeon-major of the army, the distribution of the wounded, and in short, the mechanical part of the service. (This arrangement corresponds nearly to the present consulting surgeons and general physicians of the Prussian army.) In the portable hospitals, only the first and most necessary aid was extended, and none were admitted who could be safely transported to a stationary hospital. The military physician, Colombier, at that time required that the hospital be isolated, located near a river but high and dry, have lofty rooms, chimneys and lofty windows provided with green curtains. The water closets were to connect with running water and be provided with gypsum instead of wooden bowls. The beds were to be of straw and all coverings of linen, never of wool, while the physicians, surgeons and apothecaries were to reside within the hospital. Besides these regular field-hospitals, Colombier proposed a hospital for each regiment, consisting of its own wagons and tents under which the patients could be sheltered as soon as the regiment made a halt. In this way the sick soldier stayed with his own regiment and was not sent into a field-hospital for any slight cause. The regimental surgeon knew his own people well and could treat them better. In this way they also avoided the practice of sending the patients from one surgeon to another, and from one hospital to another, remaining so short a time in each that their disease could neither be properly diagnosed nor treated. Colombier did not intend with this plan to entirely do away with the great field-hospitals, but to diminish their number. He interested himself in the whole subject of a sanitary system and recommended among other things that the soldier wear a leather waistcoat and breeches, polished half-boots, a buckram coat and a hood of oil-cloth in order to protect the head from rain, cold and sun. On account of vermin the hair was to be cut short; the marshal of Saxony had the heads of his people shaved close. He recommended meat frequently but in small quantities as it spoiled easily, and furthermore recommended the cultivation of potatoes in France according to the German custom in order to provide them for the troops. The head of the hospital was the chief-surgeon. He performed all the serious operations himself, but a physician was required to be present, and was generally called for consultation in all important cases. Only the more skilful under-surgeons and assistant surgeons were allowed to operate, and then only with the consent of the war commissary, and under supervision. When the physicians made their visits these assistants put on the bandages and could at the same time consult in any special case; but the bandage was not prepared until everything else had been properly made ready in order that the wound might not be too long exposed to the open air. Afterward they fumigated with juniper and the like. Upon penalty of a fine of 1,500 livres no hospital director dared use brandy, either in bandaging wounds or in the preparation of medicines, and every surgeon or apothecary who used it ran the risk of being dismissed from the service. Physicians as well as surgeons were responsible for the quality of the medicines and food. The students, for the most part taken from the amphitheaters, slept in the hospital and had charge of the diet of the patients and of the force of nurses; they allowed one student to ten officers or twenty-five patients, and one nurse to two officers or fifteen patients. If one of them fell asleep during his watch he was fined 20 sous; whoever left the ward was dismissed. Each one of the wounded had his own bed, if it was at all possible, to which a tablet was attached upon which name, number of bed, disease, day of entrance, food and medicines were written. Woe to the soldier who was the third time treated for syphilis! as a punishment he had to serve two years longer. In order to turn this material to the account of science special regulations were enacted. Aside from the fact that in particular cases sections were made, the chiefs of the hospitals submitted reports to the state secretary of the war department to the inspector of physicians (Médecin-inspecteur titulaire), and of surgeons (chirurgien-inspecteur titulaire). They both conducted a correspondence with all the hospitals and passed their opinions on the reports of cases. The most valuable of these were collected by a specially appointed old military physician under the title of *Médecin consultant de l'armée*, and after the Royal Society of Physicians had passed upon them were published. The journal for this purpose appeared quarterly at the expense of the State. This custom was originated by Louis XV., who ordered all the surgeons of the field-hospitals to submit their most important notes as well as a report on the topography and the epidemics of the hospitals. Richard de Hautesierk, at that time chief military physician, published these collections as "Recueil d'obs. de Méd. des Hôpit. milit." (2 Vols. 1766, 72.) The yearly salaries of the French military physicians in 1781 were as follows:

Médecin-inspecteur titulaire	10,000 livres.
Chirurgien-inspecteur titulaire	6,000 "
Médecin consultant des camps et armées,	4,000 to 5,000 "
Physicians and chief surgeons according to the rank of the hospital, 500, 800, 1,000, 1,500 and	2,000 "
Under-surgeons, with board	288 "
Assistant surgeons, with board	252 "
Students, with board	96 "
Nurses, with board	120 "

Under Louis XVI., the sick soldiers were cared for at a comparatively greater expense than in other countries. Nowhere in Europe, were there at that time, military hospitals to compare with those in the French garrison cities, where they were divided into five classes according to their size, and provided with a sufficient number of physicians and surgeons. Under the supervision of the latter, the field-physicians gave their services when necessary; accordingly there was no army in which the military physicians were so much respected as the French; for the Prussian soldier did not consider his steward as belonging to the military class and regarded any subordinate officer as a person of more consequence than the regimental physician.

The *republic* made every citizen a soldier. It could be relied upon, that the sick officer could lay no claim to better treatment than the soldier, and they took even better care than before, that the wounded should receive proper nursing. The highest authority lay with the physicians, surgeons and apothecaries, comprising the conseil de santé in Paris, which was subordinate to the minister of war, and met daily, making up the personel of the physicians in the army, according to examinations previously held, and receiving

fortnightly reports from the hospitals and the different bodies of troops. Each army had its chief physician and chief surgeon. As the chirurgien-consultant and the chirurgien-major de l'armée found their duties frequently conflicting, both offices were abolished and replaced by a chirurgien en chef de l'armée. There was only one class of physicians, while the surgeons and apothecaries were divided into three classes, according to their knowledge, merit and seniority. The physicians wore grayish blue coats with black velvet collars, with gold cord and black facings; the surgeons and apothecaries wore light blue coats with red cloth waistcoats and breeches. The different borders distinguished the three classes. The yearly salaries of the hospital physicians, who were paid monthly, was under the republic, as follows:

Chief physicians, chief surgeons and chief apothecaries	7,200 livres.
Physicians, surgeons, apothecaries, first class	4,800 "
Surgeons, apothecaries, second class	3,600 "
Surgeons, apothecaries, third class	2,400 "
Nurses, first class	1,080 "
Nurses, second class	720 "

When a battle took place, the chirurgien en chef summoned all the surgeons who could be spared from the stationary hospitals and the troops, to the *field hospitals* in every head-quarters; the over-physician and the over-surgeon collected their subordinates, a corps of whom were alloted to each army, and apportioned them among the hospitals. On the day of battle, a depot containing sufficient bandage-material, wine, bouillon, etc., was erected one or two hours march behind the army. From this point, three detachments, which were in touch with the center and both wings of the army, and could unite if necessary, were formed. Each detachment had a sufficient number of litters and wagons for transportation. The train wagons, which carried the apparatus of the field hospital, were drawn by four horses, were covered with oil cloth, and bore the words in large letters, "Hôpital ambulant nr. . . ." The wounded were first received into the field hospital where an immediate examination was made. In order to have enough room in this hospital, as many as possible were transfefred daily to the nearest hospital, and no one was admitted who could endure the journey to a stationary hospital. Soon after the battle, the regiments sent a few officers to the hospitals to find their sick and furnish them with billets d'entrée, as no one could be accepted without these. Wine, meat and bread (auf Bons), and mattresses were required to be furnished by the community. In spite of the comparatively good equipment of the field hospitals under the republic, the mortality, especially in cases of amputation, was enormously large.

At that time, in France, they performed operations which should not have been allowed, in order to boast of them; it is known that a military surgeon in the beginning of the year 1796 had made over 400 amputations. A great and frequently a very injurious abuse, as Wardenburg noted, was practiced with the roller bandage, and he said that especially in the field hospitals, where there was so much to do, the use of the sling bandage and of cloths would be much simpler (l. c. I, p. 71. The same idea was later advanced by Esmarch). There were *stationary hospitals*, as already mentioned, in all the garrison cities, and wherever the civil hospitals were not large enough, new ones were built. The most important one was the Hôtel des Invalides in Paris. It was built for 2,500 men and was provided with 430 beds for patients, of which the surgical contingent, about a hundred and twenty, were under the care of Sabatier. The second one, the Val de Grace in Paris, with its dark and dingy rooms, left much to be desired; here there was a school where Larrey officiated, and where anatomy, physiology, medicine and surgery were taught. The hospitals were divided into three classes, according to the strength of the garrison, and were under the supervision of municipal officers and of men appointed in each community by the Committee of Safety (comité de surveillance) of the Revolution, which committee consisted of patriotic citizens. These were under the dictation of the war commissary, and cared for the welfare of the patients. In a few of the hospitals courses of instruction were given; for instance, in the newly founded school of Strasburg, twelve teachers lectured gratuitously on all the medical sciences. When a patient was taken into the stationary hospital, he received hospital clothing and his own bed, with a hair or wool mattress, or a straw sack if he soiled the bedding. The wounded were separated from those having internal disease, syphilis and scabies. Over a hundred patients were allotted to one physician and over twenty-five wounded to one surgeon, while one of the attendants, who were chosen with the greatest strictness, attended twelve patients. The surgeons could perform an operation only after they had consulted with their colleagues. They were in constant correspondence with the chirurgien en chef. Food and medicines for all the hospitals were provided through stewards and not, as formerly, farmed out, to the great detriment of the patients; only the furnishing of the beds was entrusted to the contract system. Even in the middle of the century the most of the stationary war hospitals in France were farmed out, a system in which many peculations arose, and each physician was burdened with too many patients; for the personnel of the physicians depended at that time entirely upon the contractor. The diet of the patients, under the republic, was the same as we have given in the fourth chapter for the year 1781. We should add that a sentinel was stationed in the kitchen, in order to see that no meat was taken out of the pot while the meat was cooking. As early as the middle of the century, the French soldiers received a so-called ration braid, pain de munition, which was made of flour and bran. Prisoners of war enjoyed the same fare, and if necessary an interpreter was provided between them and the physicians. Card playing and tobacco smoking were forbidden in all the wards of the hospital; at night lamps were used.

(To be continued.)

Operations with the Magnet on the Eyes.—The secret of success in these cases is promptness and the extraction of the iron splinter while the wound is still gaping. J. Hirschberg inspects his apparatus twice a week and tests it to have it ready at a moment's notice, and to this he ascribes his success in saving the eye in several severe cases. He prefers the Asmus siderocope, uses cocain, and extracts the fragment with his small electromagnet, connected with a simple zinc-carbon battery, attracting a pound, combined with the large Schlosser magnet and accumulator, attracting twenty pounds. He also has on hand a still smallar magnet attracting 200 grams. Five minutes after the patient crosses the threshold, all the instruments, including the ends of the small magnets, are soaking in Schimmelbusch's soda solution, and in five to ten minutes more the iron splinter is on the table. He describes thirty-four cases thus treated, with technical success in thirty-three, in the *Deutsche Med. Woch.*, July 29, completing his record of sixty-seven magnet operations.

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SATURDAY, SEPTEMBER 11, 1897.

MEDICAL MEN AND LIFE INSURANCE.

It is very evident from the large correspondence which has come to this office, that there is a widespread distrust among the profession of the methods of life insurance companies in relation to medical services. We have no desire to engage in any controversy or criticism of any company's methods of doing business, but it is clearly just to give some expression to the numerous complaints which some of the best men in the profession are making. The following incident speaks for itself: An excellent physician examined for a leading company for twenty years, receiving from three to five dollars for each case examined. On several occasions he appeared in court as a witness for the company, receiving insignificant sums compared with others; remaining away from one to five weeks at a time. His personal medical opinion was sought and given many times a year, for which he received thanks only. On one occasion he represented the company in the settlement of a case involving fifty thousand dollars, spending three days and much time in correspondence and study, for which he received as an honorarium one hundred dollars, although his services saved the company over twenty thousand dollars. Finally he took out a ten thousand dollar policy in the company, and divided the commission with the agent. His services to the company about half paid the yearly cost of the policy. Then he was taken ill and lost his little property by accident, and the company dropped him as an examiner and he failed to keep up his policy. Then he was given a paid up policy representing the amount he had paid, and finally he died. Then his policy was disputed on account of some technical error, and after a long time a settlement was made, giving less than half of the amount called for. In all this the company was legally and technically right. It was the pound of flesh, no more or no less. The services of the physician were received at the lowest rates and gratuitously, and when their interest called for it he was dropped, and his policy received the same treatment as others. A brother of this physician defended this company in a contested policy and received five hundred dollars for three days' services in court, and yet his services were inferior to his brother's testimony in the same case. A leading company, which boasts of their munificent payments of five and ten dollars for medical examination, complained bitterly and refused to pay a very competent man fifty dollars a day in a contested case. He finally settled at thirty, although the experts on the other side were paid double this sum. While this is simply business in the commercial sense, it is the so-called liberal policy which medical directors and company managers assert so positively. The denial that companies do not encourage the aid of examiners to solicit business is contradicted in the experience of nearly all the companies. One man writes: "If it were not for the commissions from agents who share the profits with me, I would receive very little for my services." Another man writes, that while no direct bargain is made between the agent and examiner, it is expected that the examiner will suggest that his company is the best, and always advise a large policy or an increase of the present one, and receive from the agent a gratuity. Agents are always wise enough to keep up a warm interest in their company in the mind of the examiner, by presents and gratuities, and while this is not a cause for complaint, it shows that the selfishness of companies reacts and will bring its own penalties by and by.

These are only hints of the injustice and low estimation of the services of medical men by life insurance companies. There can be no doubt that the profession are responsible for this, not the companies. As long as medical men will sell their services for a mere pittance there will be buyers. Companies have no sentiment or ethics, it is simply cold selfishness—to make all the money possible, and they are ever ready to take advantage of the services of any one who will contribute to this end. The physician who fails to recognize this, and fails to demand a proper payment for his services is unwise, to say the least. One of the best physicians in the country received ten dollars for his judgment on a policy of one hundred thousand dollars. What lawyer would give an opinion on a contract involving this amount for this sum? There can be no controversy with the com-

panies, but the profession are wrong and suicidally so. There can be no change until the physician recognizes and demands an adequate return for his knowledge, which has cost him so many years of labor and effort.

OPIUM HABIT IN CHILDREN.

Among the most decidedly bizarre statements of the report of the British Opium Commission are those anent the harmlessness of the opium habit to Hindoo children. The evidence of the report as a whole would appear to a student of the law of evidence closely akin in nature to that whereby quackish procedures are "proven" to the satisfaction of promoters of patent medicine stock companies. The inveterate opium habitué is notoriously always under an opium dream as to the harmlessness or even benefit of his habit. Propaganda for spread of opium using is often a cult with habitués. From just such persons much of the testimony in favor of opium has clearly come. The evil effects of opium on children have been publicly recognized for nearly a century. CRABBE, in that series of sociologic and medical pictures, "The Borough," sang:

"Then the good nurse (who, had she borne a brain,
Had sought the cause which made the babe complain)
Has all her efforts, loving soul, applied
To set the cry, and not the cause aside.
She gave her powerful sweet without remorse;
The sleeping cordial—she has tried its force.
Repeating oft, the infant freed from pain,
Rejected food, but took the dose again,
Sinking to a sleep, while she her joy expressed
That her dear charge could sweetly take his rest;
Soon may she spare her cordial, not a doubt
Remains but quickly he will rest without."

According to the report from 60 to 90 per cent. of Hindu infants are dosed with opium. According to one witness:

"The practice is begun in the first few weeks or months of life, sometimes even from birth, and is continued up to the end of the second or third year. The dose is usually one-sixteenth to one-twelfth of a grain to begin with and this is gradually increased to a quarter or half grain and even to one or two grains, according to the age and necessities of the child. Sometimes it is given in the form of a pill, sometimes a nursing mother smears it on her nipple. It is given partly as a remedy for the ailments of infancy, partly to keep the chid quiet. A peasant woman who has to work in the fields gives her child some opium and puts him in a basket in a corner of the hut, or perhaps she takes her child to the field and puts him in a small basket and gives him a little opium to keep him quiet. Fatalities and cases of poisoning rarely occur and it should be carefully borne in mind that this practice is discontinued usually at the third year and certainly at the fifth, and has no connection with the habit which may or may not be formed when the child is grown up."

This evidence contrasts decidedly with the results of the experience both of general practitioners and students of the opium habit. Practically the majority of these will agree with CALKINS ("Opium, and the Opium Habit," 1871) in the opinion that "pestilent as is opium upon the brain developed in its maturity, yet more pernicious, times over, is the reaction when it falls upon immature years. Whether the child suck in the poison immediately through the natural, lacteal channels or whether it receives the same pure and undiluted as measured out by the teaspoon, contamination is equally assured. *Mourir en fleur ou vivre bien petit;* such is the the slippery tenure of life, such the inexorable necessity imposed. In view of such prospects what shall be thought of the fashion obtaining among families of distinction in China, that of encouraging boys yet within the age of pubeity in the use of the opium pipe, with the fallacious expectation that such habit may, perchance, exert a resistive force against appetites and indulgences of a more sensual character. The furnishing of laudunum by their impoverished parents to the children employed in the cotton mills of Lancashire may make plausible show of excuse, but what can be said in palliation of practices, such as those of lace factory employes, for instance, where the infant incumbrances (fruits of the *impermissa gaudia* enjoyed in their *liaisons de convenance*) are put upon Godfrey's cordial precedent to the stronger alcoholic tincture, by which together they are used up in about six months. Dr. HARPER of the Fen district, where laudunum is given extensively, states that the infant mortality is at an excessively high figure and his account is corroborated by the medical men and the clergy of parochial districts all over England.

The Fen district in England is singularly like India in its prevalent opium habit and the alleged causes for this. Opium is used in the Fens as in India for its alleged efficacy in malaria. In the Fens are seen, among other things, marked expressions of degeneracy despite the opium habit, survivals to old age of isolated members of a family, plural and frequently repeated births and a large infant mortality. On the evidence of benefit afforded by the first two phenomena, stress has been laid by the report of the British Opium Commission. They, and the fact of the survival of children from the opium habit, are brought into strong relief as proof of the sanative effects of opium. Such a style of argument clearly betrays an ignorance of the salient features of the biologic stigmata of degeneracy on the one hand and an unscientific pandering to commercialism by ignoring well ascertained facts as to the opium habit in children on the other. LEVINSTEIN (*Alienist and Neurologist*, 1883) found by experiment on pregnant dags and rabbits that the use of opium during pregnancy produced either abortion, still-births or rapidly dying offspring. BUREAU later (*Progrès Médical*, July 16, 1894) ascertained that

the placenta of opium-using mothers contained morphin and that this was also detected in the funis. Long ere either the experiments of LEVINSTEIN or the observations of BUREAU, Drs. CALKINS and F. H. HUBBARD had pointed out ("The Opium Habit," 1881) that the children of opium-using mothers would die unless they were nursed by their mothers or given opium. One of his cases which excellently illustrates the features of all such is as follows:

"A secundipara while pregnant with her third child was given morphin to secure sleep in consequence of an agonizing neuralgia. When labor occurred the amount of morphin used was 10 grains per diem. The third day after delivery her milk was suppressed to a great extent in contrast with the previous habit of the patient, who was usually galactorrheic at that time. The babe, bright and natural at birth, when placed on the bottle, became prostrate, cried, vomited incessantly and discharged a glairy mucus with meconium. The muscles twitched continuously and the babe died six days later from marasmus and insomnia. The mother increased the drug up to half a dram daily doses, which she was taking two years when a girl was born. The milk was suppressed. The babe, bright and vigorous, took the bottle readily, but soon displayed the same ominous symptoms as the last child. The mother suspecting the cause, secretly gave it two drops of laudunum. The effect was magical, all the ominous symptoms disappeared. The mother increased the dose until when the child was 7 years old, she was taking half-ounce daily doses of laudunum. She was in excellent physical health, bright but backward at school.

Similar cases were later reported by CARSON AMABILE, ERLEMEYER, F. B. EARLE, MATTISON and others (*Review of Insanity and Nervous Diseases*, March, 1891). These cases readily explain the phenomena of the opium habit in children cited so exultingly by the British Opium Commission. They also reveal how potent a factor of degeneracy opium is, even on the descendants of opium-using mothers cured of the habit before puberty but remaining "backward" children, which "backwardness" in the next generation would, by the law of heredity, be transmuted into any or all manifestations of degeneracy from hemophilia, hereditary gout, hysteria, deaf-mutism, epilepsy, insanity and moral imbecility down to idiocy. The error of the British Opium Commission is that of the unscientific mind which fails to see that a given hypothesis to be accepted as correct must not only explain all the facts but must exclude all other explanations.

THE GLANDULAR FUNCTION OF THE UTERUS.

In the *Archives de Physiologie, Normale et Pathologique* for July, M. J. H. KEIFFER of Brussels devotes a rather well argued article to the glandular function of the uterus; that is, to its utility in the organism as an excretory organ, eliminating toxic products in its function of menstruation. This idea is not altogether a new one, but is practically ignored in most text-books on physiology and gynecology, and the treatment of the subject in the light of modern physiology has something in it of novelty. We are accustomed of late to think of a possible extra-generative function of some of the organs of reproduction; the testicle and the ovary are supposed, with some reason, to furnish an internal secretion that has its purpose and value in the systemic economy, but the uterus is not so commonly regarded in a similar light and menstruation has been considered as a result or attendant of ovulation and therefore purely an incident of the generative function, perhaps a quasi-pathologic result of a somewhat abnormal human evolution. The glandular structure of the uterine mucosa has been credited with merely furnishing the needed mucous secretion of such an internal cavity suited to its special reproductive function.

The disturbances noted as following disorders of the menstrual function are many of them such as would naturally suggest an auto-intoxication, but it has been customary rather to refer them to some obscure reflex influence than to poisoning by retained products, notwithstanding the fact that an actual excretion normally occurs. M. KEIFFER'S argument is based on an experimental study of the relations of the muscular and vascular apparatuses and the mucosa, his observations having been made both on the human female and experimentally on the dog in the condition of rut, and he finds that while the arrangement of blood vessels is such as to indicate that the nutrition of the epithelial tubes of the uterine mucous membrane is of the very first importance, the function of the latter does not seem to be exclusively limited to the production of mucous or mucin. There is, as was well known before, though its importance has perhaps been underestimated, a decided chemical alteration in the menstrual blood—it does not clot like ordinary blood, and he maintains that the uterine epithelium acts here like the kidney glomerule and that fibrin passing the one is analogous to albumin passing the other. CHARRIN (*Gazette hebd.*, Jan. 3, 1896) has shown that the blood is at its maximum of toxicity at the menstrual period, and that disordered menstruation has its affect upon other secretions, infants at the breast being affected by such conditions in their nurses. The menstrual process, M. KEIFFER holds, acts in two ways, preparing for the maturation of germinative elements and exciting genetic activity on the one hand, and on the other eliminating from the organism certain products of secretion that failing their direct bio-chemical application in reproduction must be rapidly discharged. If this elimination fails, if these products are not utilized or gotten rid of, they acquire a toxic property and their reabsorption gives rise to the disturbances of the nutrition and the derangement of systemic equilibrium that we observe as the effect of disordered or suppressed menstruation; the vascular, secretory, digestive and psychic disturbances that are generally and rapidly relieved by the re-establishment of the function

in its full normal activity. Menstruation has been called a disappointed pregnancy, and in this point of view it is easy to see how the results of such will need to be gotten rid of in the normal economy of the organism. The uterus is in that sense certainly an excretory organ during the whole reproductive life, and the disturbances of the menopause are the results of an auto-intoxication from products to which the system only gradually becomes more accustomed and tolerant, until finally, with the suppression of the genetic function, they cease to be produced. The influence of the ovarian internal secretion can not well be invoked to account for auto-intoxication symptoms, such as many of those of the menopause and those accompanying menstrual suppression and disorder seem to be. Chlorosis, with which menstrual disorders generally seem to be associated, often in a causal way, may also possibly be properly considered as, in part at least, a symptom of uterine auto-intoxication according to this theory of the uterus as an excreting glandular organ, and certain anemic disorders following parturition may possibly also fall into the same category.

It has heretofore been the custom to attribute all or many of these disturbances in the economy to a reflex influence from the genital organs, an easy but not very definite method of explanation. If we adopt the theory here proposed, that throughout the sexual life of women there is a constant contribution, it may be from all parts of the organism, of material destined for reproductive purposes, which failing its normal function must be thrown off through the process of menstruation, and which if retained causes promptly the symptoms of intoxication of the system, we have at least advanced a step beyond the mysterious and ill-defined "reflex influence" that has hitherto been invoked. The theory certainly has some merits and some facts apparently to support it, and it is, at all events, one that is suggestive and worthy of some consideration.

THE LIMITATIONS OF SERUM DIAGNOSIS.

While the preponderance of evidence thus far accumulated is in favor of the specificity of serum reactions the time is not yet ripe for a final conclusion upon this important subject. It certainly were a great gain if the diagnosis of diseases dependent upon isolable micro-organisms could be always established with certainty by this means. In many cases the test would not be necessary, but there remains a considerable number in which doubt exists from beginning to end. It is especially in these, and for hygienic and prophylactic reasons, that a reliable if not an infallible means of diagnosis would be of the greatest practical utility.

M'FADYEAN (*Journal of Comparative Pathology*, December, 1896) found that the blood serum from a case of glanders in the horse caused well-marked agglutination of glanders bacilli in bouillon culture, and FOULERTON (*Lancet*, May 1, 1897, p. 1201) has now made a similar observation in a case of glanders in man. In testing the serum a bacillary emulsion was made by adding five c.c. of a 0.5 per cent. solution of sodic chlorid to a five days old culture of the bacillus on glycerin-agar. The contents of the tube were shaken up gently and then allowed to stand for about an hour in order that any small particles visible to the naked eye might settle. The upper part of the fluid was then pipetted off and the emulsion thus obtained was found to be in every way suitable for the experiments. The bacilli used were of a stock isolated from pus derived from the patient in question. In hanging-drop preparations in which the proportion of serum to bacillary emulsion was one part to nine, large clumps always formed before the specimen could be transferred to the stage of the microscope for examination. With one part of serum to nineteen of the emulsion agglutination invariably occurred within ten minutes. The agglutinative action of the serum was equally well shown in test-tube experiments. Samples of normal human serum used in the proportion of one part to nine of the emulsion caused no change whatever in the bacilli, whether in hanging-drop preparations or in test-tubes.

On repeating the foregoing experiments with a similar bacillary emulsion, but substituting for the glanders serum antidiphtheric serum and also serum from cases of typhoid fever, equally well-marked agglutination of the glanders bacilli took place. Similar results were also obtained with bouillon-cultures of the bacilli, control experiments being carried on throughout. On reversing the experiments it was found that a certain though decidedly less active agglutination of the typhoid bacillus was caused by both antidiphtheric serum and glanders serum.

These observations, if confirmed, would render doubtful the value of the serum reaction in glanders as an aid to clinical diagnosis. In conclusion, the opinion is expressed that it is most unlikely that the unknown substance which in the serum of typhoid fever, for example, exerts so potent an influence on the typhoid bacillus should be inert as regards other bacteria. It should, therefore, not be surprising that the equally unknown but probably similar substance in antidiphtheric serum has an agglutinative action on the bacilli of both glanders and typhoid fever.

CORRESPONDENCE.

Klondike Nosology.

CHICAGO, Sept. 6, 1897.

To the Editor:—The editorial in the JOURNAL of August 28 headed "Klondike Nosology," recalls to me certain experiences in Alaska that might possibly supplement those of Dr. Rosse. His personal knowledge of the Alaskan climate appears to

have been derived from summer trips upon government vessels, which in a country where winter reigns nearly two-thirds of the year, could hardly afford a perfectly adequate conception of all its phases and possibilities.

My own experience with that region dates back to a period considerably anterior to my medical education, but I can, notwithstanding this fact, recall some observations that in the light of subsequently acquired knowledge, may have some medical value. A brief summer sojourn would have given me a very different notion from that I actually obtained as to the climate and its effects.

Dr. Rosse makes but the briefest mention of the one disorder that is, I think, the most to be feared by those going into the country, at least where there is any possible predisposition to its occurrence, viz., rheumatism. I have seen both natives and whites disabled by it, and one of the worst cases of chronic rheumatism I have ever seen was in a Sitka Kaloshan Indian who had been transferred to the lower Yukon region. I have no doubt that many of those who spend one or more winters in the country will date troubles of this kind from that sojourn.

Scurvy is mainly a preventable disease, but a taint of it is likely to follow the long darkness and monotonous diet of an Arctic winter, and it is possibly from this that an exception I have noticed to Dr. Rosse's statement as to the healing of wounds, orignates. In men apparently in robust health, and conscious of no bodily ailment, I have seen the slightest scratch become a festering sore, requiring weeks for perfect healing. A slight cut of the finger would sometimes become a wide crack extending almost to the bone and this apparently without suppuration or causing severe pain, or great inconvenience to the sufferer. This occurred when what was thought to be reasonable care was taken as to cleanliness; neglected wounds followed pretty much the same course, according to my observation, as elsewhere, though I can recall no cases of erysipelas or other malignant process. Sloughing and suppuration were common enough after severe frost bites even when under good care. Among the Eskimos there certainly ought to be no lack of bacteria, and one of their common treatments of wounds was an application of a generally utilized liquid, stale urine, which from its strong ammoniacal nature seems to saponify the oily deposits upon the skin and thus tend rather to cleanliness. It should be added that they usually finished the treatment with ablutions of clean water and the general effect upon the intact skin was good rather than otherwise.

Alcohol may be one of the best antiscorbutics in summer, but I should disagree with Dr. Rosse as to its value in the far north in winter and doubt whether the quality of the liquor would have much difference on the natives. In the case of the St. Lawrence islanders, I have heard that the depopulation was mainly due, not directly to the alcohol, but to starvation following the debauches. They neglected to lay up their supplies and died in consequence, and it would have made little difference whether they were drunk from the meanest rot-gut or the best Hennessey brandy. I should say here that the Eskimo is the only North American aborigine that I have ever seen go deliberately into the retail liquor business, dealing out the drink to his fellows and abstaining himself. I doubt whether any other native would have such self-control under the constant temptation. They are born traders, however, and a keg of whisky well watered is one of the most profitable stocks in business, so one temptation probably balanced the other. They are as Dr. Rosse says, subject to colds and lung troubles and the epidemics of civilization have been especially fatal. I have heard of deserted villages from smallpox, and undoubtedly the grippe has had its run amongst them. Other disorders which they seemed especially subject to were mild ophthalmia, possibly originating in snow blindness or in their smoky huts, and various skin diseases; favus is one that I can recall. Syphilis and gonorrhea appeared to be rare at that time, but may be more prevalent now.

I can agree with what Dr. Rosse says as to their intelligence and capacity, but that has been remarked by many observers.

One thing remains to be mentioned, that is the depressing influence of the long winter darkness upon many who experience it. I have known of several cases of insanity probably from this cause, and at least three suicides. It is possible that there will be many cases of this kind in the Klondike crowds next winter, and I can say that the extreme north is not the best region for those who have a melancholic predisposition. Aside from this, and the dangers of rheumatism, scurvy, starvation, subsequent lung disorders, snow blindness, freezing etc., the far north is a fairly healthy latitude. Malaria, as Dr. Rosse remarks, has been observed on Cook's Inlet, and I have seen a Finlander suffering from what was apparently chills and fever after sleeping out in the tundra at St. Michaels in the month of May. A healthy man from a warm or temperate climate, with plenty to eat and wear, good shelter and cheerful company and surroundings and who keeps clean and who takes plenty of exercise, will generally stand his first winter well. He may find subsequent ones less comfortable, and it is quite possible that after his return to warmer latitudes he may have some reminder of his northern experiences in the way of rheumatism, lung troubles, etc. Of course this does not apply to men of especially rugged physique, but it is likely to be true of a large class of average individuals, and especially so with those who have any predisposition to such ailments.

Of the Klondike region itself I have had no experience, my personal knowledge of Alaska being mainly confined to the coast and lower Yukon district, like that of Dr. Rosse himself. But notwithstanding certain climatic differences that must exist, the perils to life and health must be in the main the same in both regions; what is true in this respect of the one is probably true also of the other.

Very respectfully, H. M. Bannister, M.D.

Dr. Upshur's Final Reply to Dr. Woodbridge.

Richmond, Va., Aug. 23, 1897.

To the Editor:—I had hoped not to trespass upon your valuable space further, but the offensive communication from Dr. Woodbridge in your issue of August 21 can not be passed unnoticed. Now, sir, it can not be possible that Dr. Woodbridge is ignorant of the fact that Messrs. Parke, Davis & Co. are advertising Woodbridge treatment of typhoid fever, and will send the literature to any one who applies for it. The pamphlet referred to contains liberal extracts from the several papers read by Dr. Woodbridge and refers to the source from which taken, therefore must be the genuine utterances of Dr. Woodbridge. Why does he permit this wholesale drug house to put him in so equivocal a position? Does he deny that the statements made in this "advertising circular" are genuine? But, sir, there is no need of examining the circular, his paper published in the July 10 number of the Journal is identical in style, statement and "*testimonials*" with the pamphlet. Now this word seems to be especially offensive to the Doctor. Let me say to him they are like the other testimonials referred to in being mere bald assertions, not proven from a scientific standpoint. The Doctor is kind in suggesting a title for my paper; had I had the honor of his acquaintance before the meeting of the Association no doubt it would have been adopted. He ridicules my quotations from the circular—it is *his circular*, or *purports to be*. The Doctor's valuable lecture on disinfection I will lay to heart and when opportunity occurs it shall be applied to his *manners*, which his communications show need purifying. He evidently does not know how a gentleman should conduct himself in a scientific controversy, that

there is no justification or excuse for the utterance of a libel on the personal character of his opponent. I would advise this very progressive M.D. to buy some modern works on practice and study the pathology of typhoid fever; I think *even he* can learn something from Tyson, Osler, Wilson, Wood & Fitz and a number of other *modern* works on practice. In criticizing me he has no right to ignore the authorities I quote to sustain my position. I *had not* been a member of the ASSOCIATION only a "few hours" when I read my paper and would remind him that the cordial reception it received showed it had the approval of the Section. My time expired and a motion for its extension was unanimously carried. The statement that I have violated the written or unwritten law of the profession is in no sense true. What egotism for Dr. Woodbridge to arrogate to himself and endorsers that they are *the* medical profession. He distorts what I say to further his own argument. I do not wish it understood that good men are lacking in a true appreciation of the responsibility in the care of typhoid fever, but it is true that men trying conscientiously to do their duty fail to make accurate observations. I am glad to accord to my professional brethren all the courtesy which belongs to them in the report of medical facts or results, but I have a right to demand a reason for the hope that is in them and ought not to be required to take what is said on blind faith. No, not even from so absolutely an infallible man as the Doctor himself. I am sorry the Doctor has not the circular referred to; I have always found Messrs. Parke, Davis & Co. most courteous to the profession and I am sure they will supply the Doctor with one if he will write for it. He will then, after examining it, have an opportunity to forbid its *farther circulation*, if he desires (?).

Respectfully, J. N. UPSHUR, M.D.

The Antivivisectionists.

August 30, 1897.

To the Editor:—In your recent editorial entitled, "The Antivivisectionists and Their Little Bill," you allude to the appellation "of degenerates or perverts" being applied to those who are in favor of restriction of vivisection.

There is a larger number of the medical profession in favor of the antivivisection bill than its opponents suppose and they won't be "muzzled" by being called by revolting titles.

It is no more a convincing argument to liken humanitarians to weak-minded members of the criminal classes than it would be a just retort for them to claim that those most actively engaged against Senate Bill No. 1063 were men who simply desired to slaughter their thousands of dumb animals as a means of professional advertisement.

I beg to enter my protest, therefore, against what I consider an attempt to suppress free expression of opinion from the humaner members of our most noble profession through the creation of a false sentiment against them, as well as by the false statement of facts pertaining to the above-mentioned bill.

E. O. N. K.

ANSWER:—In our remarks on the subject we were very far from saying that all antivivisectionists were perverts; we only said some of them were, and cited instances. There are no doubt many excellent persons in this movement who are simply misguided.

The Maker of a New Instrument.

AURORA, ILL., Sept. 2, 1897.

To the Editor:—Since the publication of my article in the JOURNAL on "A New Curette," I have been in receipt of numerous inquiries as to where the instrument is made. A footnote in the original article stated that it was to be made by Sharp & Smith, but, I presume from some oversight, was omitted. I shall deem it a great favor if you will make a note as to who the makers are in the next issue of the JOURNAL.

Sincerely, C. L. SMITH, M.D.

NEW INSTRUMENTS.

AN IMPROVED HYPODERMIC SYRINGE.

The accompanying illustration shows one of the latest improvements in the hypodermic syringe. The case is of aluminum and is curved to fit the body when carried in the vest pocket. It may be sterilized by boiling. The piston packing is of rubber and is greatly superior to asbestos which shreds, and to leather

which has a tendency to harden. The packing may be speedily renewed by any one. This case was designed by the Mulford Company and is supplied with two reinforced needles and eight tubes of selected hypodermic tablets.

SOCIETY PROCEEDINGS.

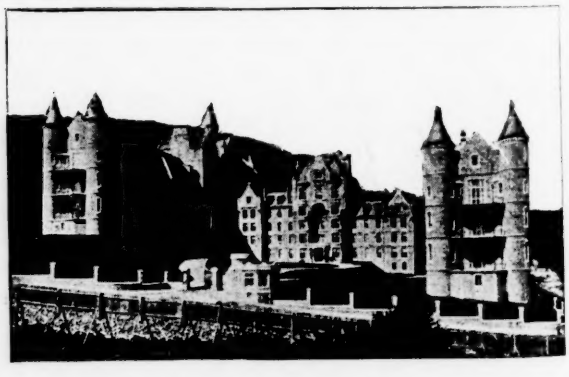
British Medical Association.

Sixty-fifth Annual Meeting, held at Montreal, Aug. 31 to Sept. 4, 1897.

T. G. RODDICK, M.D., M.P., Professor of Surgery in McGill University, Montreal, presiding.

The opening service of the Association was a sermon at the English Cathedral, St. Catherine Street, by the Right Reverend the Bishop of Niagara (Dr. Dumoulin) at noon, Tuesday, August 31.

The opening ceremonies in the afternoon were held in Wind-



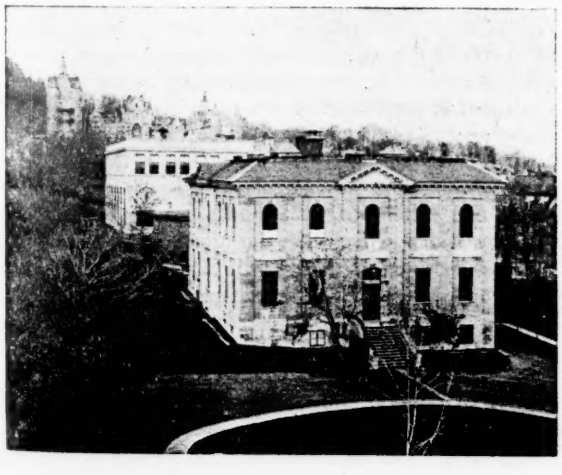
ROYAL VICTORIA HOSPITAL, MONTREAL.

sor Hall. The chair was occupied by the President of Council, Dr. Saundby, in the absence of Dr. Roddick, the President of the Association. In addition to the members of the Council of the Association; the Governor-General of Canada (the Earl of Aberdeen); the Lieutenant Governor of the Province of Quebec, Sir Adolphe Chapleau; the Mayor of Montreal; the Right Hon. Lord Lister and the Right Hon. Lord Strathcona and Mount Royal occupied places on the platform. Dr. Saundby

spoke of the unusual circumstances of the meeting of the Association, as it had never before been held outside the British Islands, making the Montreal meeting an adjourned meeting, the first part of the annual meeting for 1897 having been held in London, July 27, in order to comply with the obligations imposed on the Association by statute and by its by-laws.

Dr. RODDICK, taking the chair, introduced the Mayor of Montreal, who, welcoming the Association to the city of Montreal, spoke of the appropriateness of holding the first meeting of the Association outside the British Islands in the Dominion's metropolitan city and in a British colony under a colonial president, thus showing that the Association was not of Great Britain but of Greater Britain. He believed that nowhere in the sovereign's vast dominions had the Diamond Jubilee been celebrated with more loyalty or with more enthusiasm than in Montreal, as there, French-Canadians, Irish, Scotch, English and other nationalities, of varying creeds, vied with one another to do honor to themselves in honoring their world-honored sovereign. He spoke of McGill, Laval and Bishops Universities and other educational institutions of Montreal, and their living monuments to the names of such men as Lord Mount Stephen, McDonald, Redpath, Morris, Galt and others. Reference was made to the erection of Royal Victoria Hospital, which stands at the foot of Mount Royal, by the munificence of Sir Donald Smith and Lord Mount Stephen; Montreal General Hospital, the oldest hospital in the Dominion; Notre Dame Hospital; the Western General and other such institutions which give Montreal first rank in proportion to her population and size, so far as regards her institutions.

WESTERN GENERAL HOSPITAL, MONTREAL.



THE MEDICAL COLLEGE, McGILL UNIVERSITY, MONTREAL.

Sir ADOLPHE CHAPLEAU welcomed the Association in behalf of the Premier of Quebec, extending to them the freedom of the province, as every citizen was ready to extend to them the freedom of the country.

The GOVERNOR GENERAL of Canada (Earl of Aberdeen) gave the third address, welcoming the Association in the name of the Dominion.

After the roll of delegates of foreign countries and medical societies was called and those in attendance were formally presented to the President and the Governor General, the presidential address was delivered by Dr. Roddick on:

CANADA, ITS MEDICAL LIFE AND RESOURCES.

LAVAL UNIVERSITY, MONTREAL.

He made many apt references to the distinguished guests; Lord Lister, the most illustrious surgeon of our generation; the representative of La Belle France, Dr. Charles Richet, professor of physiology in the University of France, and others.

MONTREAL GENERAL HOSPITAL.

He traced the history of the British Medical Association from its organization in 1832; went into detail concerning Canadian climatic conditions, the health resorts, the effect of the Canadian climate on European races, Canadian Spas, medical education in Canada, nursing, medical legislation in Canada, etc.

On motion of Lord Lister a vote of thanks was extended the speaker, after which Dr. Saundby expressed the obligations of the Association to the Governor-General, Lieutenant-Governor Chapleau and the Mayor.

In the evening a soirée was given at Laval University; an address by Professor Richet, official Representative of the French Government (to be published in the JOURNAL at an early date); and a reception by the Governor-General.

WEDNESDAY, SEPTEMBER 1.

The morning was devoted to section meetings at McGill University.

At the afternoon session the "Address in Medicine" was delivered by WILLIAM OSLER, M.D., F.R.C.P. (*vide* p. 507). The meeting was then converted into a convocation of McGill University and the degrees of LL.D. conferred on the following: The Right Honorable Lord Lister; Dr. Charles Richet; Sir Walter Foster; Sir William Turner; Dr. Henry Barnes; Prof. Michael Foster; Dr. W. H. Gaskell; Mr. Christopher Heath; Dr. Alexander Macallister; Dr. R. Saundby and Claud Wheelhouse.

The remainder of the afternoon was occupied by a garden party given in the grounds of the Royal Victoria Hospital, and the evening by a reception by Lord Strathcona and Mount Royal.

THURSDAY, SEPTEMBER 2.

The morning was again taken up with section meetings.

At 1 P.M. the Association and its guests were tendered a luncheon on Mount Royal, by the Mayor of Montreal. Following this the address in surgery, "The Surgeon of Old in War" was delivered in Windsor Hall, by Mitchell Banks, F.R.C.S., of Liverpool (to be published in the JOURNAL at an early date).

An international golf match, garden parties, and the laying of the foundation stone for the Nurse's Home at Montreal General Hospital, occupied the remainder of the afternoon. In the evening the annual dinner of the Association was given at the Windsor Hotel, and a concert at Windsor Hall.

FRIDAY, SEPTEMBER 3.

Section meetings, as usual, occupied the morning hours. The afternoon session was taken up by an "Address in Public Medicine," by Herman M. Biggs, M.D., Director of the Bacteriologic Laboratory of the Health Department of New York City. The address covered a wide field, was well received and contained much detailed information of the bacteriologic work of the Health Department of a great city, more valuable as giving the members of the Association an insight into the workings of one of our American cities.

After the address an invitation was extended the members of the Association, by the American Public Health Association, to be present at their twenty-fifth anniversary in Philadelphia, Oct. 26 to 29, 1897. The evening was taken up by a Conversazione at McGill University.

SOCIETY NEWS.

The Tennessee State Medical Society will meet next year at Jackson. The officers are W. D. Haggard, M.D., Nashville, Secretary; T. K. Powell, M.D., Dancyville, President.

The French Congress of Alienists and Neurologists was held at Toulouse in August, in honor of Pinel and Esquirol, the pioneers of the modern humane treatment of the insane in France. Esquirol's maxim was: "One must love the insane to be worthy and capable of serving them." Busts were installed in the capitol, similar to the statues already erected on the scenes of their labors, the Salpétrière, Paris, and at Charenton. "The Diagnosis of General Paralysis" was the subject of the first address, by Arnaud, who described the dual orders of symptoms as: Physical, *i.e.*, troubles in speaking; the gradual and progressive internal ophthalmoplegia; psychomotor ataxia and cerebral accidents. 2. Mental, *i.e.*, the generalized and progressive dementia, evidenced by the lack of mental power, by the absurdity of the mental operations, association of ideas, reasoning, judgment, rather than by the absurdity of the ideas themselves; by the gaps in the memory; by the change in the moral sense, and in the conduct and actions. In certain cases of congestive insanity and pseudo-paralysis it is impossible to differentiate at first, and also in the prodromic period while general paralysis may be suspected, there are no positive signs to establish the diagnosis. After 55, general paralysis is extremely rare. With a patient over 50, showing signs of arteriosclerosis, we must remember that generalized cerebral atheroma may simulate clinically general paralysis, or may be associated with it. True hemiplegia should also impose a doubt, as the probability of general paralysis is slight in that case, and some other pathologic condition certainly exists. Blindness opposes rather than favors the diagnosis of general paralysis. If the affection has developed rapidly, or after an infection (syphilitic) or toxic condition, and if there is alcoholism, it is best to wait for further developments before diagnosing. Others dwelt upon the relations between alcoholism, syphilis and general paralysis, for which they prepare the soil. Professor Mossé reported a case of an unknown disease, still undescribed; a neurofibromatosis of the cerebellum and base of the encephalon. Bézy's address on "Infantile Hysteria" is given in full in the *Progrès Méd.* of August 7. He agrees with Pitres that the hysteric child *nascitur non fit.* Neuropathic antecedents, scrofula, tuberculosis, gout, have all been signaled in the etiology. The manifestations develop according to the education, emotions and contagion. Traumatism and conditions of the prepuce requiring surgical intervention have also caused it to develop, even in very young children (Bosc, infant, eighteen months). Infective diseases have also aroused it.

The International Medico-Legal Congress, Brussels, August 2 to 7. —The following recommendations were adopted after addresses and much discussion of the subject of the criminal insane: 1, the establishment of a special asylum by the State for the criminal insane; the judicial authority alone to be the arbiter of their confinement; 2, the confinement can only be terminated by decree of the judicial authority, and only when the morbid affection is considered positively cured and free from all probability of a relapse. The judicial authority may decree the release provisionally and under certain conditions; 3, the decree of release from confinement to be revocable whenever the mental condition of the patient inspires serious fears of a relapse; 4, every convict who becomes insane to be confined in a special asylum, or at least in a special quarter of an asylum; 5, these measures are to apply also to those individuals convicted of a crime or misdemeanor whose penalty has been attenuated on account of their mental condition. If confinement is necessary when their term of punishment expires, it shall be decreed by the jurisdiction in which they were tried. Numerous telling examples showing the necessity of these recommendations were described; among them we note the case of a parricide recently acquitted in Paris, on the ground that he was an "impulsive," who at once resumed his occupation of a barber. Dr. Norman Ken's address on the "Legal Responsibility of the Drunkard" was repudiated by the Congress in so far as it admitted the excuse of irresponsibility for drunkards. "Intoxication by Carbonic Oxid" was presented by Bergé and Nobele, while Brouardel, Vleminckx and Depaire joined in the discussion. The Congress finally adopted the conclusions: 1. Death from carbonic oxid is very frequent and often fails of recognition. 2. This intoxication rarely occurs alone, but is usually associated with other gases, which accounts for the variety of phenomena observed. 3. It is rarely used with criminal intent and death from it is usually accidental, although the number of suicides from it is quite large, especially in France. 4. The duration of exposure is as important a factor as the amount inspired. 5. The small-

est proportion prejudicial to health is 0.05 per cent. 6. Intoxication is possible when the gas is still not sufficiently concentrated to extinguish a lamp. Intoxication from illuminating gas is also possible when the concentration is not sufficient to produce an explosion in contact with flame. 7. Complete saturation of the blood with carbonic oxid is not possible during life. It has never passed beyond 79 to 80 per cent. 8. Death from carbonic oxid is not always accompanied with a lowering of the temperature. 9. Sugar has frequently been noted in the urine of persons intoxicated with it. 10. The diagnosis of intoxication from this cause is based principally on the spectroscopic and chemic examination of the blood, but the characteristic indications in the blood may be entirely absent if, in addition to the CO, the inspired air contained also another gas, carbonic acid for instance. 11. The time of its disappearance from the blood is still undetermined. Pouchet has observed it still present sixty hours after the intoxication. 12. The differential diagnosis between intoxication from carbonic oxid and from illuminating gas is very difficult, and neither chemic analysis nor the anatomo-pathologic changes are sufficient to distinguish these two modes of intoxication. Study of the accompanying circumstances can alone decide. 13. Carbonic oxid is unique in its action on the hemoglobin, preventing the passage of the oxygen to the tissues, and it has still another special effect, evidenced by the facts: 1. That the symptoms of intoxication from it differ from those of simple asphyxia. 2. That serious symptoms appear before the blood contains enough of the CO to allow them to be ascribed to the asphyxia. 3. Intoxication from it is followed by profound disturbances in the nervous system, also by trophic disturbances in the skin and intestines, which can not be ascribed to simple asphyxia. 4. It can also lead to chronic intoxication characterized by globular anemia accompanied by disturbances in the general nutrition. The question of medical secrecy led to long discussion, in the course of which Brouardel remarked that when there is a medical secret it should be absolute, but that many things in medicine are not secret and others only occasionally secret. He added that the physician's declarations of death in France do not reveal the name of the deceased, and that the persons who receive the declarations of contagious diseases are sworn to secrecy and keep their pledge. The question was finally referred to the next International Congress, Paris, 1900, expressed as follows: The physician should have the right to invoke his professional secrecy in regard to the facts learned by him, in the exercise of his profession, concerning a person who is, might be or might have been implicated through these facts in some legal or criminal proceedings, or affected in his honor or reputation. Other subjects discussed were "Subserous Ecchymoses," "Internal Factors in the Putrefaction of Bodies," "Docimasia Pulmonum," "Intoxication from Meat," and "Hypnotism and Criminality." The attendance was not so large as expected, but was thoroughly international and will prove to have hastened the day when the great science of forensic medicine, requiring such encyclopedic knowledge and experience, will receive due recognition and support from the state.

Mississippi Valley Medical Association.—Arrangements are now about completed for the meeting of the Association at Louisville on Oct. 5 8, 1897. The different passenger associations have granted a round-trip rate of one and one-third fare on the certificate plan. The sessions will be held at the Liederkranz Hall, and the headquarters will be at the Louisville Hotel. The following are among those whose papers have been accepted:

J. B. Murphy, Chicago, Address on Surgery; J. V. Shoemaker, Philadelphia, Address on Medicine; I. A. Abt, Chicago, The Nature of Croup following Measles; J. C. Ayers, Cincinnati, Further Observation in the Use of Hydrogen Dioxid in the Treatment of Blepharitis Marginalis; W. F. Barclay, Pittsburg, Milk, Its Production and Uses; J. F. Barnhill, Indianapolis, Regarding Hypertrophied Faucial Tonsils; J. M. Batten, Pittsburg, Report of Five Cases of Heart Disease; J. K. Bauduy, St. Louis, Some New Thoughts in the Treatment of Locomotor Ataxia; A. C. Bernays, St. Louis, Paper; A. F. Bock, St. Louis, The Surgical Treatment of Basedow's Disease; John Young Brown, St. Louis, Some Remarks on Appendicitis; Sanger Brown, Chicago, Some Anomalous Conditions of the Spinal Cord, with Report of Cases; Eug. G. Carpenter, Cleveland, Posterior Radicular Neuritis; W. Cheatham, Louisville, Of what Assistance has the Serum Treatment of Diphtheria been to the General Practitioner; Archibald Church, Chicago, The Differential Diagnosis and Treatment of Cerebral Hemorrhage and Cerebral Softening; J. W. Cokenower, Des Moines, Iowa, Neurotic Deformities in Children; A. H. Cordier, Kansas City, Ectopic Pregnancy, Clinical and Pathologic Phases; J. Homer Coulter, Chicago, Paper; Ephraim Cutter, New York, Beef—A War Paper; Richard Deway, Wauwatosa, Wis., Some Cases of Insanity in Adolescence; Arch Dixon, Henderson, Ky., To Drain or not to Drain; Kennon Dunham, Cincinnati, The Hypodermic Syringe and Its Use in Malaria; C. Travis Drennan, Hot Springs, Ark., Report of a Case of Anesthesia Produced by Mercury, with Remarks; Sherwood Dunn, Los Angeles, Mothers and Daughters; J. Rilus Eastman, Indianapolis, Diagnosis by Inspection in the Urinary Tract; A. R. Edwards, Chicago, The Diagnosis of Abscess of the Liver based upon a Study of Twenty-five Cases; Jos. Eichberg, Cincinnati, Typhoid Fever Treated Without Cold Baths; C. Fisch, St. Louis, The Antitoxic and Bactericidal Properties of the Serum of Horses treated with Koch's New Tuberculin (T. R.); F. R. Fry, St. Louis, Pressure Symptoms After Head Injuries; A. H. Goelet, New York, The Surgical Treatment of Fibroid Tumors of the Uterus; Spencer Graves, St. Louis, Appendicitis; H. Hatch, Quincy, Ill., Severe Injuries from Electricity and What Best to Do; A. G. Hobbs, Mouth-breathing in Children; discussion opened by Dr. H. W. Loeb; B. W. Holliday, Cleveland, The Civic Aspect and Therapy of Some of the Common Neuroses; A. F. House, Cleveland, Symptoms and Surgical Treatment of Perforated Intestinal Ulcers; W. H. Humiston, Cleveland, Ohio, Cocain Anesthesia in Perineorrhaphy; C. C. Jacobs, Frostburg, Md., The Treatment of Obstructive Lesions of the Urinary Tract, Anterior to the Bladder, with Especial Reference to the Enlargement of the Prostate Gland; A. C. Klebs, Chicago, Paper; E. L. Larkins, Terre Haute, Ind., Appendicitis; F. F. Lawrence, Columbus, Ohio, Hysterectomy; Elmer Lee, New York, The Elimination of Empiricism in the Treatment of Pneumonia; I. N. Love, St. Louis, The Relations of the Secular Press to Medicine and the Public; C. F. McGahan, Aiken, S. C., The Treatment of Pulmonary Phthisis; A. H. Meisenbach, St. Louis, A Plea for Early Operation in Cholelithiasis; L. Harrison Mettler, Chicago, Neuroses of Gout; Robt. T. Morris, New York, Paper; Harold N. Moyer, Chicago, Paper; A. M. Owen, Evansville, Ind., Cathartics and Constipation; A. J. Ochsner, Chicago, Treatment of Hernia in Old Men; Curran Pope, Louisville, Ky., Sanitoriums a Necessary Factor in the Treatment of Chronic Diseases; Joseph Price, Philadelphia, Paper; J. Punton, Kansas City, The Growing Needs of Medical Political Organization; D. C. Ramsey, Mt. Vernon, Ind., Municipal Sanitation of Tuberculosis; A. Ravogli, Cincinnati, Tuberculin in Dermatology; B. Merril Rickets, Cincinnati, Abdominal Incision for Ascites; Byron Robinson, Chicago, The Classification of Peritonitis; Enno Sander, St. Louis, The Carlsbad Springs of the United States of North America; E. W. Saunders, St. Louis, Therapeutic Properties of Infant Foods; E. J. Senn, Chicago; The Treatment of Suppurating Fistulous Tracts; E. B. Smith, Detroit, Experimental Surgery; J. O. Stillson, Indianapolis, Retro-bulbar Optic Neuritis; L. Strauss, St. Louis, Primary Tuberculosis of the Rectum with Report of Cases; J. A. Stuckey, Lexington, Ky., Intratympanic Surgery in Chronic Suppuration; J. B. Taulbee, Mt. Sterling, Ky., The Treatment of Wounds by the Open Method; H. M. Thomas, Chicago, Experimental Work of the Penetrability of Vaporized Medicaments in the Air Passages; K. K. Wheelock, Fort Wayne, Ind., Plastic Operation for Reforming Interpalpebral Space; Alex. C. Wiener, Chicago, Congenital Dislocation of the Hip; Frank Woodbury, Philadelphia, Paper.

Titles of papers should be sent to Dr. Thomas Hunt Stucky, President, Louisville, or to Dr. H. W. Loeb, Secretary, St. Louis.

BOOK NOTICES.

Transactions of the Medical Society of the State of New York for the year 1897. Cloth, 585 pages. Illustrated. Published by the Society, 1897.

The work is well edited, well bound and on excellent paper. The contents comprise reports of committees, of list of members in attendance at the 1897 meeting, minutes of the proceedings, obituaries, lists of officers of the Society from its organization to the present time members, conditions of eligi-

bility to membership, county medical societies and incorporated voluntary medical societies with forty-six papers, many of them of great value to the practitioner.

Transactions of the Sixth Annual Meeting of the American Electro-Therapeutic Association, held Sept. 29, 30 and Oct. 1, 1896, at Boston, Mass. Cloth, 140 pages. Illustrated. Published by the Association.

Lists of officers, honorary fellows, fellows and associate fellows, committees and the Constitution and By-Laws occupy sixteen pages. The remainder of the text is taken up with the "Proceedings of the Sixth Annual Meeting," including many papers of interest and value. An appended chart is so arranged that the reader can instantly note the symptoms, treatment, results, etc., of the cases referred to in the various papers.

First Annual Report of the State Board of Medical Registration and Examination of Ohio, 1896. Cloth, 180 pages.

The report of the Secretary and an official register of physicians, arranged by counties, occupies the major portion of the book. There is also an index to the official register: 1. Graduates. 2. Legal Practitioners. An alphabetical list of midwives and of physicians holding one year certificates issued on examination is also given; by the appendix this is brought down to March 8, 1897. The statutes of Ohio regulating the practice of medicine and surgery, occupy thirty-two pages, including a list of colleges recognized by the State Board during and prior to 1896.

Transactions of the Indiana State Medical Society, 1897. Cloth, 500 pages. Illustrated. Indianapolis. 1897.

This volume covers the forty-eighth annual session of the Society held in Terre Haute, May 20 and 21, 1897. Besides the "President's Address" and thirty-seven other papers, the book contains reports of the various committees, stenographic report of the transactions, the Constitution and By-Laws, a list of the delegates, a list of the members and officers of county societies and an alphabetical list of members. The work is well edited and on excellent paper.

Proceedings of the Nebraska State Medical Society. Twenty-ninth annual session. 1897. Cloth, 375 pages. Illustrated. Published by the Society.

This volume contains, as the title indicates, full proceedings of the Society; a list of the officers, a list of the members, forty-six papers, minutes of the session, etc. A well arranged index adds much to the usefulness of the volume which is a credit to the Society both in contents and workmanship.

Illustrated Catalogue of Batteries and Electro-therapeutic Appliances. Manufactured by the McIntosh Battery and Optical Company. Chicago.

This edition contains descriptions of many new appliances and is fully up to the standard of its predecessors. The net prices of the articles are substituted in place of gross amounts admitting of misleading discounts.

PUBLIC HEALTH.

Yellow Fever.—An outbreak of yellow fever is officially announced at Ocean Springs, Miss., and one case has appeared at New Orleans, traceable to a sojourn at Ocean Springs. As usual the initial cases were termed cases of dengue, and the suspicions of the public if any existed were allayed, but "yellow jack," like murder, "will out," and the discovery has created something very like a panic in those places where the people were accustomed to go to Oceans Springs, Pass Christian, Biloxi and Pascagoula for the sea bathing, and gulf breezes. The usual talk of shotgun quarantines is heard, and stringent quarantine and inspections by the duly authorized State officers. In the hands of Dr. Saunders, Dr. Oliphant, Dr. Patton, Dr. Haralson, Dr. Eugene Wasdin, M.-H.S., and others the public may be assured that all will be done that can be done to prevent the spread of the disease. That their effort may be crowned with success is the fervent wish of every sanitarian, but the number of cases that is reported, makes it probable that even the best directed efforts will not avail to prevent other cases here and there. Prompt isolation of these cases, which will occur this week if at all, will prevent a further spread. It is too soon just now to say much about the origin of the epidemic, although its source is doubtless easily discoverable and was long ago pointed out.

A Yellow Fever Suspect at Boston.—At midnight, August 31, the steamer *Orion*, Captain Smith, bringing 2,058 bales of wool from the wrecked steamer *Ethel Gonda*, arrived at quarantine and was there detained several hours. One of the divers died at St. Lucia on August 12, after a two weeks illness of what might have been by liberally doubting "Chagres fever," but as during the voyage other suspicious cases were developing one of the party was taken ashore at Galloup's island to be under observation for two or three days. The culture method is to be resorted to for diagnostic corroboration. The effects of the crew however were thoroughly fumigated before the steamer was allowed to come to Boston.

A Quarantine Against Smallpox has been declared against trains from Montreal by the Health Board of Ottawa.

Cholera in Bombay now seems to be replacing the plague, and the city's sanitary condition is still far from perfection.

The Inter-State Conference on Convict Labor will meet during this month at Nashville, Tenn. What is wanted is a system under which all able-bodied convicts will be kept at work and treated humanely. There must be a golden mean between idleness and the chain-gang.

Great Britain in the Van.—A motion is to be made in Parliament, as soon as it reassembles, "that in the opinion of the House of Commons it is desirable that a Department of Public Health be constituted, and that the same be under the charge of a responsible minister having a seat in Parliament."

Health in Michigan.—The August report, as compared to that of July (*vide* JOURNAL, August 28, p. 452), shows consumption was present at 193 places; measles at 52; diphtheria at 39; scarlet fever at 28; whooping cough at 23 and typhoid fever at 56 places. Compared with the August average for eleven years (1886-1896) influenza was more prevalent, and remittent fever, dysentery, cholera infantum, intermittent fever, cholera morbus, consumption and inflammation of the bowels less prevalent.

Yellow Fever at Colon.—A news item in the New York *Tribune* (August 31) is to the effect that the Colombian authorities are striving to suppress the true condition of affairs, and with somewhat of success as the physician in charge is a government employe, Dr. Randall, reports ten cases and seven deaths in the French hospital at Colon, and adds that he knows at least six cases of yellow fever that died there whose names do not appear. He believes that there have been three times as many cases with the same ratio of deaths as stated in his report. Dr. Randall adds that there have been treated at the St. Thomas Hospital, Panama, to the above-mentioned date thirty-six cases with fourteen deaths, and at the French hospital fifty-eight cases with twenty six deaths.

Bubonic Plague Prophylaxis.—Dr. Haffkine (*Crit. Med. Jour.*) utilized the knowledge gained by Koch in his cholera bacillus experiments, namely, that the bodies of Koch's bacilli cultivated on solid media, when inoculated into persons exposed to cholera, produce a reduction of susceptibility and of the absolute mortality from the disease without affecting the case mortality. He therefore combined the bodies of the microbe with the toxins secreted in the surrounding media. The procedure was the killing of the microbes by a temperature of 70 degrees C., and then the use as a prophylactic injection of the nutrient

fluid containing the dead microbes, along with the toxins produced and held in solution. From January 10 to May 6, 1897, 11,362 have been inoculated with the fluid with but twelve fatal cases. Of these, three were already sick at the time of inoculation and three others contracted the disease within twelve hours of inoculation. The question seems to be between mitigation and cure.

Value of Antitetanus Serum as a Preventive.—Nocard reports to the Académie de Médecine of Paris, as the result of thorough investigation, that antitetanus serum is *unfailingly and absolutely effective in preventing tetanus.* He has distributed 7,000 vials since August, 1895 each containing 10 c.c., and he reports the effect on 2,727 animals (2,395 horses, donkeys or or mules; 44 bulls; 82 rams or lambs and 206 hogs. Each received two injections at an interval of ten to twelve days (20 c.c. for larger animals and 6 to 10 c.c. for the smaller). Three hundred animals received the preventive injection immediately after an operation (castration, amputation of the tail, ablation of tumor, operation for cryptorchidia or hernia, etc.), and not a single animal was affected with tetanus. A second group includes 400 animals which were injected with the serum from one to four days after an accident, a fall, bite or kick from another horse, bruise, wound soiled with dirt or manure, etc., none of whom succumbed to tetanus, and only one contracted the disease, a horse injected five days after an injury at the hands of the farrier. The disease was extremely benign in this case and the horse was at work again seven days later. A weak dose of the serum is sufficient to prevent tetanus if injected shortly after the animal has received the dose of toxin inevitably fatal for the control animals. The tests were made in localities noted for the prevalence of the disease, some of the farmers having been compelled to abandon certain operations that enhanced the market value of their stock on account of the number lost by tetanus. His sixty-three correspondents, while testing the serum, observed 259 cases of the disease in their other animals not treated (191 horses, 57 rams and 11 cattle). The *Bulletin*, July 27, contains the tabulated details.

Anthrax in Pennsylvania.—The recent outbreak of anthrax in Pennsylvania may arouse a controversy in which more than one of the National Bureaus may be involved. The Secretary of the Treasury is to report the facts to the Secretary of the Department of Agriculture as soon as he returns to Washington. The exclusion of infected foreign hides is a subject with which the Treasury Department alone has to deal, but the regulations for the disinfection of such hides before shipment to the United States were formulated in the first instance by the Chief of the Bureau of Animal Industry, recommended by the Secretary of Agriculture and adopted by the Treasury Department. The carrying out of these regulations is one of the duties of consular officers of the United States in foreign countries from which hides of neat cattle are exported to the United States. The Pennsylvania case is not a new one, except that it involved the loss of human life, that loss being attributed to the results of tanning infected foreign hides, but the subject is beset by serious difficulties. In the first place, the law itself is defective. It applies only to "neat cattle and the hides of neat cattle," whereas the skins of sheep and goats, and wool and hair also, may be infected with the germs of anthrax and other infectious or contagious diseases. The intent and purpose of the law as expressed in the statute are to prevent "the introduction or spread of contagious or infectious diseases among the cattle of the United States." In the second place, anthrax is a disease which is not uncommon among domestic cattle, the hides of which are offered for sale in the domestic markets. Moreover, according to the best authorities, it is exceedingly doubtful whether by any process of disinfection the vitality of the germs of anthrax can be destroyed. That is the opinion of Dr. Salmon of the Department of Agriculture, who has devoted much study to the subject.

Alien Rule as a Conservator of Races.—An item in an English paper, with the census of Egypt as an inspiration, points out a gain of 42 per cent. in the population during fifteen years, the greater part of which has been gained during the British occupation. By a curious coincidence a French newspaper also comments upon the French-Canadian increase—from 70,000 in 1765 to 1,800,000 in 1891, and more than two million at present. At the close of the civil war in the United States an official enumeration of the population of British India, made by the British Government in 1867, put the population of that country at 144,000,000 exclusive of 47,000,000 inhabitants in districts under British jurisdiction but not under direct British control. This was thirty years ago and the population of India at that time was 191,000,000 in all. By the last imperial census made by the British authorities, the population of India was 287,000,000. The credit of the phenomena is cheerfully given to the introduction of superior sanitary regulations and to a government with a more just dispensation of rational laws as well to a greater premium on life-values in general. Dependence or even antagonistic rule does not seem to have been a factor in these conclusions. The French Canadians who have shown, during the past century, so large an increase, are exhibiting in their colonies in New England a like, if not a larger, ratio of increase, the material conditions in the United States being better than they are in Canada. Australia is another English dependency, though it is less dependent than most English colonies, which has shown a remarkable increase in population during the past twenty years, whereas those Danubian States which acquired their independence some years ago have advanced some in population though relatively little when compared with the neighboring States either left under Turkish jurisdiction or put under the rule of Austria. May not clanship with its more agreeable domestic relations, an acceptance, tacit though it be, of the caste system, and the cheerful acceptance of surroundings have more to do with these results than racial pride cares to admit. Still the subject is a most interesting one as proven by the plaudits of the press for the broad English philanthropy exhibited during the plague and famine in India.

Respiratory Manifestations of Plague.—The *Medical Press and Circular* calls attention to the fact that a very material source of error appears to exist in regard to the devastations of the plague, in the fact that some of the death losses have been charged against pneumonia and other respiratory causes. Regarding the death of a prominent English official of Bombay, the *Circular* remarks: "He exhibited none of the ordinary signs of bubonic plague, but a bacteriologic examination proved beyond a doubt that his death was caused by the specific organism of the disorder in question. A similar result was obtained in three other cases where hospital patients were reported to have died from pneumonia. In view of these facts, the mortality returns of all places where plague has been epidemic will have to be read by the statistician in a fresh light. In Bombay, for instance, there has been of late an enormous increase in the official list of deaths published under the head of 'respiratory diseases.' It may fairly be assumed that a proportion of such cases, although diagnosed as pneumonia, fever, or bronchitis, were really due to bubonic plague of an atypical or ambulant form. The danger of non-recognition of so virulent and eminently contagious a disease is sufficiently obvious to require no more than passing mention. The fact of such an occurrence has long been known to medical writers on the subject, but it may be doubted if it has gained anything like wide recognition. The reason for this local manifestation offers a problem of great interest and importance to the scientific medical investigator."

Mytilotoxin, the Ptomain of the Mussel.—The oyster is not the only shell-fish that is dangerous to man, when obtained for food from localities that are near to sewage outlets. Dr. Ridley Bailey, medical officer of health of Bilston, England, in a recent report, records an instance in which four persons, visitors to Blackpool, were seized with symptoms of ptomain poisoning shortly after consuming raw mussels procured from the vicinity of a sewer outfall, and two of these four persons subsequently developed enteric fever at such a date after the ingestion of the mussels as to render it highly probable that the shell-fish were the means of conveying the disease. These facts were reported to Dr. Jasper Anderson, medical officer of health of Blackpool, who stated that there were at that place in October last no less than six cases of enteric fever which had apparently been caused by the ingestion of raw mussels procured from a bed where sewage contamination was a matter of probability. Dr. Anderson very properly had notices placed on the mussel beds warning the public as to the danger of consuming the fish. Ptomain poisoning as the result of eating mussels dates back, however, considerably earlier than 1883, and it is recorded that in 1827 some thirty persons were attacked with serious symptoms, which in two cases ended fatally, after eating mussels collected from the dock gates at Leith, and animals to which some of the mussels in question were given were similarly affected. Amongst other disasters of a like nature may be mentioned that of Wilhelmshaven, where the mussels which caused the mischief were procured from the bottoms of two vessels in the harbor; and in 1890 there occurred what was known as the "Seapoint calamity," in which a mother and four children died from the effects of eating mussels procured from a locality to which sewage had access. There is still much to be learned in connection with the subject of mussel poisoning, but it is obvious that there are other factors than idiosyncrasy involved. It is generally considered that the poisonous effects are due to what is known as mytilotoxin, a poison produced by the agency of bacteria which have as a rule been conveyed to the mussels through the sewage pollution of the water in which they have grown or been placed; and although there would seem to be certain instances on record in which sewage could hardly have polluted the water, a large number of outbreaks have been caused by mussels taken from places liable to pollution of one kind or another, and there is thus evident need for some control of the mussel industry. The cooking of all mussels intended for human consumption would doubtless do much to remove the risks of contracting enteric fever, but this process would not be equally effective against ptomain poisoning. In this latter connection it may be of practical utility to record that in the Wilhelmshaven outbreak, which was investigated in one or another of its aspects by numerous observers, amongst whom were Virchow and Salkowski, it was discovered by the latter that mytilotoxin became inactive when treated with carbonate of soda, and that mussels boiled for some six minutes in a solution of this salt lost their toxic properties, a fact which appears to afford indication for treatment in cases of poisoning by mussels.

Sewer Air and Sewer Gas.—It has been chiefly in England that the injurious action of sewer gases escaping into houses was insisted upon and typhoid fever was one of the principal diseases attributed to these causes. The reports of Simon on the Sherborne epidemic in 1872 and of Buchanan on the outbreak of typhoid fever at Caius College in 1873 are quoted as representative of the opinion of English experts. In contradistinction to these views, the majority of writers on hygiene in Germany maintain that sewer gases are incapable of disseminating typhoid fever or other infectious diseases; and, in support of these conclusions, allusion is made to the investigations of Flügge, Gärtner, Preusnitz, Rubner and Soyka. As early as 1881 the last named authority demonstrated by statistics at the Vienna meeting of the society that cities provided with sewers were not in any way more liable to the attacks of diseases of this type than those wholly undrained; indeed, he proved the converse of this theory and showed that in a series of towns which had recently been sewered on the modern system the mortality from typhoid fever had diminished and that in those parts of the towns where the sewerage was defective the cases of typhoid fever were more frequent and more severe than in those quarters which were well drained. Many other authorities were cited and figures given to show the condition of drained and undrained towns, among which the facts relating to Dantzig and Munich before and after the introduction of drainage are recorded, also the investigations of Baron into thirty-seven undrained towns and forty-six towns provided with a system of sewers. Passing thence to the discoveries of Pasteur and Koch and their followers it is shown that a correct knowledge has now been gained of actual disease germs and of the best means of withstanding them. It may be pronounced with absolute certainty that any given disease can only occur when the known organism recognized as the active agent of the same has acquired vitality. In the absence of the typhoid bacillus there can be no typhoid fever, and where there is no cholera vibrio there can be no cholera. The gases caused by putrefaction, however poisonous they may be, can not produce diseases of the above kind. The author points out that certain of these pathogenic germs which may enter the sewers mixed with fecal matters and soiled water do not find in them very favorable conditions for their existence, and that for the most part these organisms lose their virulence in sewage water. In order that the sewer-gas theory may be realized it must, however, be assumed that certain of these infectious germs are capable of floating in the air and thus entering dwellings. Nageli has, however, shown that this is not possible and he has proved that these germs can neither ascend into the air nor be given off from moist surfaces; and in the air of sewers, moreover, bacteria have been ascertained to be invariably present in but small numbers; indeed, frequently such air is absolutely free from these organisms. Uffelmann has been at some pains to ascertain the species of bacilli found in sewer gas and a list of these is given. It is stated that it follows from these arguments that there is no proof of there being any connection between sewer gas and the spread of epidemic diseases. On the question of the extent to which, apart from their liability to spread disease, sewer gases may prove injurious to health the author asserts that this depends mainly on the degree of concentration in which certain undoubtedly poisonous gases exist which are found in sewers and other places where putrefying matters are collected and stored. The thorough and effective ventilation of sewers and soil pipes is the best mode of combating this evil. A distinction is drawn between sewer air and sewer gas and it is pointed out that the latter can only form in sewers which contain dead ends and in other places where effective ventilation is wanting. In well-constructed sewers the contents pass away freely and rapidly without undergoing putrefaction and the air in such sewers is in no way unhealthy. The house drains and soil pipes are much more likely to engender evil smelling and injurious gases than are the sewers.—Dr. S. W. Abbott in the *Boston Medical and Surgical Journal*, April 8.

NECROLOGY.

EDWIN M. KITCHEL, M.D., assistant professor of histology and pathology in his Alma Mater, the College of Physicians and Surgeons, New York, died as a result of injuries received by falling from a piazza, in the course of a game of "blind man's buff." This occurred at the summer home of his family at Hulett's Landing, Lake George, on the evening of August 24. The patient was taken to Roosevelt Hospital, New York City, but death from the spinal injury resulted August 26 at 1 A.M. He was the only son of James T. and Irene A. Kitchel of Newark, N. J.

J. D. THOLOZAN, M.D., born in France in 1820, served in the army and as professor at Val de Grace until 1865, when he was sent to Persia in an official capacity and became in time the body physician of the late Shah of Persia, which reponsible position he filled for thirty years, and accomplished much in introducing hygienic and sanitary ideas into the country. He was an *associé national* of the Acad. de Méd. and of the Acad. des Sciences, and also commander of the English order of St. Michael and St. George, which conferred the title of Sir upon him. His best known works were on the "Bubonic Pest."

of its," the "Causes of the Decadence of the Mussulman ingis," and "Pulmonary Hemorrhage," with several treat- urn quinin, etc., published in Persian.

L. H. BAILEY, M.D., Santa Cruz, Cal., August 24.——E. L. oley, M.D., Streator, Ill., September 1, member Illinois State ledical Society.——George Sproson Jones, M.D., Covington, Ind., August 25, aged 56 years.——F. M. Pearman, M.D., Warsaw, Ind., September 3, aged 61 years.——John A. Richards, M.D., Farmington, Me., August 28, aged 68 years.——Thomas J. Hayes, M.D., Beverly, Mass., August 26, aged 35 years, member of the Massachusetts Medical Society.——J. E. Albee, M.D., Detroit, Mich., September 1.——John M. Swift, M.D., Northville, Mich., August 30, aged 65 years.——William H. Brinley, M.D., Minneapolis, Minn., September 1, graduated from Yale Medical Department, 1881.——George W. Vogler, M.D., Philadelphia, August 26, aged 42 years, at Estes Park, Col.——H. R. O'Connor, M.D., Pittsburg, Pa., August 30, aged 44 years.——Dr. Ballue, of Paris and Arras, drowned from collision of his yacht *Priny* with the Belgian mail steamship, of Dunkirk, aged 40 years.——Benjamin R. Whitaker, M.D., University Pennsylvania, 1866, of Phenixville, Pa., died in Philadelphia, August 18, aged 53 years.——John R. Cabell, M.D., University of Virginia, 1850, was assassinated by a tenant of his farm August 26. He was a resident of Danville, Pittsylvania Co., Va.——Louis Fellows Root, M.D., College of Physicians and Surgeons, New York, 1882, died in Tarrytown, N. Y., September 3, of cardiac disease. He was born in Chatham, N. Y., Feb. 19, 1859.

MISCELLANY.

A Source of Wealth.—Last year California marketed 452,110 gallons of mineral water, valued at $249,580.

Cigarette Smoking in Japan is on the increase. Every month 13,000,000 imported and 52,000,000 native cigarettes are being consumed. Women and children smoke almost as much as men.

Carbohydrates in Leuconuclein.—Bang reports that he has succeeded in splitting a pentose from the nuclein of the leucocytes, leuconuclein, in a suppurated tuberculous pleural effusion.—*Deutsche med. Woch.*, No. 21.

Neuropathic Curvature of the Spine.—A careful study of two cases of curvature of the spine by S. J. Popow, is published in Nos. 14 and 15 of *Wratsch*. By exclusion of other pathologic relations he is forced to the conclusion that each case had a neuropathic basis.—*St. Petersb. Med. Woch.*, July 17.

Dulness on Percussion of the Apices without Pathologic Alterations.—In cases of long illness and repose in bed, the muscles become relaxed and the capacity of the lungs diminished. W. M. Kernig reports thirty-five such cases in which, while the lungs were normal, there was dulness on percussion.—*St. P. med. Woch.*, July 17.

The Blood After Resort to Higher Altitudes.—The increase in the number of red corpuscles is more marked and more rapid in consumptives in the early stages than in healthy persons. An altitude of only 236 meters is sufficient to produce the increase.—Meissen and Schröder, *Münch. med. Woch.*, No. 24, in *Wien. klin. Rund.*, July 18.

Electric Conductibility of Animal Fluids.—Prof. A. v. Koranyi has continued his researches on the osmotic force and molecular concentration of animal fluid, which have led him to the discovery that the electric conductibility of the fluids can serve as a measure of the volume of serum and of the blood corpuscles, and thus has a direct diagnostic value. Full details of the investigations are to be published at once in the *Zeitsch. f. klin. Med.*, but the preliminary communication is in the *Cbl. f. Phys.*, July 10.

What Constitutes an Exploratory Operation.—The opening paragraph of an editorial in the *Medical and Surgical Reporter* (August 7) thus defines: "An operation begun for the removal of diseased organs and ending in failure to remove the pathologic conditions found should not under any circumstances be termed an exploratory operation. It should have applied to it the new term 'inoperable,' or should be designated, according to the vernacular, a 'flunk.'"

Absorption of Fats from Enemas.—Deucher has found that fat is absorbed from enemas, but never more than 10 grams at most, even in experiments lasting twenty-four to forty hours. The absorption is favored by administering the fats in the form of an emulsion, adding 6 per thousand salt solution, warming to the temperature of the body, careful cleansing of the intestines previously and long retention.—*Cbl. f. Phys.*, July 10.

Calculus in the Urachus.—The patient complained of pain in the abdomen and retention of urine appearing suddenly after twelve years of turbid, often bloody urine. A tumor was palpated in the median line between the umbilicus and the symphysis. When removed it was found to consist of a large phosphatic stone enclosed in a sac of tissue, communicating with the bladder by an opening as large as a forefinger. The calculus weighed two and three-fourths pounds.—*St. Petersb. Med. Woch.*, from *Wratsch*, No. 1.

Impermeable Gelatin.—According to the *Revue Scientifique* a company has been organized to manufacture waterproof paper for dressings, etc. The paper is dipped in a solution of 1,000 grams gelatin dissolved in four liters of water with 1,000 grams of glycerin. After it has been well soaked in this it is again dipped in a solution of 750 c.c. commercial formol, with distilled water q. s. to make five liters and dried, when it becomes impermeable, resisting even the action of direct steam.—*Nouv. Remèdes*, July 24.

Exteriorization of the Sensibility.—By this term Joire designates the condition he has observed in a few peculiarly susceptible hypnotic subjects in which the skin is anesthetic, but there seems to be a zone surrounding the blindfolded subject at a little distance, in which he feels pricks and pinches of the empty air as if they were made on corresponding portions of his person. A needle inserted noiselessly in a glass of water held between his hands, affects him like a prick, and even a pencil pointed at him he feels as if pressed against normal skin. Some interesting observations are described in the *Nord Méd.*, July 15.

Surgical Intervention in Tuberculous Meningitis.—D. Ssokolow trephined the skull in two cases of tuberculous and one of suppurating meningitis, and although the three patients died soon afterward he considers that the temporary benefit obtained justifies further attempts. He advises trephining the parietal eminence, opening the membrane first. If no fluid appears, the lateral ventricle must be punctured with the trocar. He also suggests that the introduction of air might be beneficial, as in abdominal tuberculosis; lumbar puncture made simultaneously would facilitate the introduction of air.—*St. Petersburg Med. Woch.*, July 17.

The British Association for the Advancement of Science ended its sixty-seventh annual meeting at Toronto, Canada, August 25, with a dinner given to about four hundred guests. The meeting this year was generally regarded a very satisfactory one. There were full programs, able papers, fine weather in an unequivocally clean city, and exceptionally convenient buildings for both the large and the small gatherings. The love-making between the two parts of the British Empire, the presence of so many Americans and the remarkable number of garden parties given in honor of the visitors were other features. Some of the over-sensitive talked about the scant

mention of the Americans, without regard to the dictum that there is "no courtesy in science," and turned idly away after having seen Lord Lister. The majority, however, seemed pleased as well as edified by their share of paleontology, botany, anthropology and geology, while medicine contented itself as usual with a "Vanity Fair" exhibition of its progress.

Correction.—Through error in copy the "Response to the Address of Welcome to Delegates from the American Pharmaceutical Association," was credited to F. W. Stewart, instead of F. E. Stewart (*Vide* JOURNAL, August 21, p. 355).

Turnip Plates for Gastro-enterostomies.—R. v. Baracz contributes a review of the various methods of performing this operation, to the *Wiener Klinische Woch.*, of July 22, expressing his preference for Senn's plate method as the best in all respects; as shown also by the statistics when compared. He, however, advocates making the plates of turnip, and describes an observation that confirms his views, supplementing a previous observation of his own, one by Heigl, and two by Butz. The turnip is absorbed in a few days. He considers gastro-enterostomia antecolica simpler and easier, and advises having on hand a couple of pairs of plates, made fresh, to allow a choice when the size of the intestine is disclosed.

Lauwers' Method of Abdominal Hysterectomy with Buried Pedicle.—He performs supravaginal amputation of the uterus according to Hofmeier, Fritsch, Chrobak and others, but modifies it by detaching a large flap of the peritoneum from the anterior surface of the uterus down to the collum uteri, which exposes the uterine arteries and permits their being ligated separately. After amputation down to the collum the mucosa and musculature of the cervix are cut as necessary and sutured. The anterior peritoneal flap is then drawn over the sutured uterine stump and sutured to the peritoneum behind it. This cover over the stump prevents the slightest infection by way of the vagina. Fifty operations; mortality 4 per cent.—*Cbl. f. Chir.* July 24.

Rare Case of Hemorrhagic Bacterial Septicopyemia.—A strong, perfectly healthy young man was taken suddenly with chills, pains in the limbs and with a few ecchymoses on the lower extremities, but no other symptoms, no ulcerations nor sensitive areas. The third day delirium set in; the whole body became covered with the cutaneous hemorrhages, with albumin, red corpuscles and hyalin and granulated casts in the urine; the lungs and blood remained normal. Temperature rose to 40.5 degrees C. Death occurred the sixth day. The necropsy disclosed pus foci in the brain, eye, retropharyngeal space, suprarenals and articulations, although they had not been swollen *intra vitam;* also hemorrhages into the various organs, parenchymatous nephritis and fresh verrucous endocarditis. The presence of staphylococcus pyogenes albus in the blood was established.—J. Gwosdinski, in *Russkij Archiw* No. 3, in *St. Petersb. med. Woch.*

The Lloyd Jones Theory of Chlorosis.—A waif from the *British Medical Journal*, July 25, which in a spirit of space economy we are obliged to condense, sets forth the following: Roy's invention for weighing a drop of blood is the inspiration of the investigation, and the blood examination of 1,400 healthy persons constitutes the basis of what may even yet prove an hypothesis. The weight of blood varies with the quantity of hemoglobin and less closely with the number of cells. "Nothing," says Lloyd Jones, "is more characteristic of chlorotic blood than extreme diminution of red blood corpuscles together with an equally marked reduction in the amount of hemoglobin." This result is obtained not by counting the cells but by measuring their volume centrifugally. Chlorosis has some seeming connection with child bearing, for lighter blood indicates greater fertility and dark complexioned people are less prolific. "With these views," says the *British Medical Journal*, "it is natural that he (Lloyd Jones) should hope to explain chlorosis by some auto-intoxication from [illegible]ctive ative organs.' The ovaries have failed him hitherto as[illegible]vere now examining the uterus. He has no difficulty in sh[illegible]er that the stomach and intestines have not yet been pr[illegible] guilty. Whether he will have more success with the or[illegible] now accused remains to be seen."

Rapid Technique for the Preparation of Eyes, etc.—The enucleated eye or other small organ is placed immediately in 10 per cent. formol, from which it is transferred after twenty-four hours to the following solution: Formol, 20; sodium phosphate, 40; glycerin, 300; aq. dest., 1200. This solution is renewed every day for eight to ten days. This process preserves the coloring of the eye and its normal relations. A glass jar is then filled with melted jelly and the eye placed in it, the concavity down. When the interstices are filled the eye is turned over, care being taken not to include bubbles of air. When the jelly is set, the jar is closed with a sheet of glass and fastened with Canada balsam. The jelly is made of 8 parts of pure gelatin to 8 parts each of glycerin and water. The gelatin is dissolved in the water at a moderate temperature, the white of an egg is added and the whole boiled, then filtered through flannel and the glycerin and an antiseptic added (thymol, phenic acid, formol), which preserves the jelly without injury to the piece.—*Jour. de Méd. de Paris*, July 25.

Surgeon General J. Rufus Tryon, U. S. N., on September 7, completed the term of four years for which he was appointed, but does not reach the retiring age until Sept. 24, 1899. The Secretary of the Navy is giving the application of the Surgeon-General for reappointment his strong support so as to fulfil the unwritten law to permit him to retire with the rank and pay of the highest grade filled by him. In this respect his case is similar to that of his predecessor, Surgeon-General J. Mills Browne, and other heads of staff corps at the present time. Surgeon-General Tryon is a native of New York, a graduate of Union College and the medical department of the University of Pennsylvania, class of 1861. He served with distinction during the War of the Rebellion, and in the line of duty has visited nearly every port of the habitable globe. In 1874 he volunteered for service during the yellow fever epidemic—an act for which he was specially commended by his superior officers. His administration of the medical department of the Navy during his term of office has been conspicuous for the many changes and improvements instituted, all tending to the advancement of the Medical Corps and to the care and comfort of the sick and wounded in the Navy.

Liability for Autopsy on Dead Body of Child.—The question was raised on demurrer, in the case of Burney v. Chidren's Hospital in Boston, whether the father of a child, who is its natural guardian, and who has intrusted the child to a hospital for treatment, can maintain an action against the hospital for an autopsy performed on the dead body of his child without his consent. The sole contention of the counsel for the defendant hospital was that no such action could be maintained, because there is no right of property in a dead body. But the supreme judicial court of Massachusetts says, June 16, 1897, that the father, as the natural guardian of the child, was entitled to the possession of its body for burial. Being entitled to the possession of the body for the purposes of burial, it then asks, is not his right against one who unlawfully interferes with it, and mutilates it, as great as it would be if the body was buried in his lot and was thence unlawfully removed? That an action may be maintained in the latter case there are decisions showing; and, although it is a new question in Massachusetts, the court holds that an action may be maintained in the former case. This is in line with several well-considered decisions in other States. But it was not argued by its counsel whether the nature of the defendant hospital was such that an action against it could not be maintained for the alleged illegal acts

of its officers and servants, and the court refrains from expressing an opinion upon it. Nor did it feel disposed to inquire under what circumstances an autopsy is justifiable—leaving both questions until the facts should be before it, after trial.

Resection of the Cervical Sympathetic vs. Thyroidectomy in Basedow's Disease.—Jaboulay reports three new cases in which he has resected the cervical sympathetic, raising the total to fourteen cases on record (the first in 1896), all of which have shown constant improvement. Péan, on the other hand, rejects this operation as transient in its effects, as he performed it in one case three years ago, principally to cure a concomitant epilepsy. There was at first marked improvement of both troubles, but the success was not permanent and he never tried it again. He advocates thyroidectomy for Basedow's disease, stating "that it should only be performed after medical treatment has failed and before the disease has exhausted the strength to the point of compromising existence. The operation is easy when the goiter is small, not inflamed and readily enucleated; a few minutes are all that is necessary to remove the tumor through a small median, vertical incision without any necessity of ligating the vessels if his hemostatic forceps are used, which serve also for retraction. Even in the most serious cases the operation is not difficult, but the tumor should be removed by morcellement after compressing the vessels. Consecutive myxedema is rare and transient." If the patient is troubled by hypersecretion of the laryngeal and tracheal liquids he suspends the operation, raises him to a sitting posture and removes the mucus with a mounted sponge. "Section of the cervical sympathetic and exothyropexy have not yet recorded a sufficient number of cures to be profitably opposed to thyroidectomy."—*Bulletin de l'Académie de Méd.*, August 3.

Solidity in Radical Cure of Hernia.—Lucas-Championnière has performed this operation 650 times in the last sixteen years, and his success in securing such solidity that the patient is less exposed to hernia afterward than one who has never been ruptured, leads him to raise his voice in protest against any method of cure that does not absolutely remove the serous funnel or close up the inguinal ring as inevitably superficial and imperfect, referring especially to the Lannelongue chlorid of zinc cure. He emphasized the necessity of freely opening up the hernia, excising all the omentum accessible, destroying the sac and its infundibulum and restoring and strengthening the walls by crossing the flaps, closing with drainage. With this method he has only had twenty relapses in all and five deaths (two avoidable). One relapse was a butcher who lifted a whole side of beef on the end of a pole; another relapsed during an attack of whooping cough. He slyly adds that there is not much chance of any relapse having occurred without his knowledge, as patients and colleagues are not diffident about reporting them. He has had one relapse in his last 200 cases. Rapid obesity is the principal cause of relapses, as he has already proclaimed (*vide* JOURNAL, vol. 28, p. 556).—*Bull. de l'Acad. de Méd.*, August 3.

Liability for Bodily Injury Caused by Fright.—Whether, in an action to recover damages for an injury sustained through the negligence of another, there can be a recovery for a bodily injury caused by mere fright and mental disturbance, was a question never decided in the State of Massachusetts, until the supreme judicial court handed down its decision, May 19, 1897, in the case of Spade v. Lynn & Boston Railroad Company. The court holds that there can not be. It says that it remains satisfied with the rule that there can be no recovery for fright, terror, alarm, anxiety or distress of mind, if these are unaccompanied by some physical injury; and, if this rule is to stand, it thinks it should also be held that there can be no recovery for such physical injuries as may be caused solely by such mental disturbance, where there is no injury to the person from without. The logical vindication of this rule it declares is that it is unreasonable to hold persons who are merely negligent bound to anticipate and guard against fright and the consequence of fright, and that this would open a wide door for unjust claims, which could not successfully be met. But the court takes pains to add that this decision does not reach those classes of actions where an intention to cause mental distress or to hurt the feelings is shown, or is reasonably to be inferred, as, for example, in cases of seduction, slander, malicious prosecution or arrest and some others. Nor does it include cases of acts done with gross carelessness or recklessness, showing utter indifference to such consequences, when they must have been in the actor's mind.

Paget's Disease of the Skin. Dr. Rolleston, before the London Pathological Society, brought up the subject of dermatitis maligna, or Paget's disease. Two cases were discussed, in both of which carcinoma had resulted. The first case was that of a man aged 60 years, who had the glazed, raw condition of the skin above the pubes characteristic of the disease for eight years; two years ago nodules of carcinoma developed. The whole affected area was removed and the man recovered. A somewhat similar case, in which the scrotum and penis were affected, had been described by Dr. Radcliffe Crocker. The carcinoma probably developed from the sebaceous glands and not from the superficial layers of the skin. The sweats glands were dilated, but did not, as in Dr. Crocker's case, appear to be undergoing carcinomatous change. The growth was a spheroidal-celled carcinoma. The second case was that of a woman aged 45 years. The skin affection began eight years ago on the sinus of a mammary abscess and had spread most extensively. A year ago carcinoma developed. The whole affected area, together with glands from the axilla, was successfully removed. Microscopically the carcinoma appeared to be squamous-celled, showing a transition to a spheroidal celled type, but no keratinization had taken place. The modification was probably due to the extensive inflammatory changes, which were also thought to be responsible for the extensive vacuolation seen in the epithelial cells. The carcinomatous growth had certainly not arisen in the mammary glands or in the ducts, as is often the case. It was suggested that Sir James Paget's name would best be honored by associating it with the actual morbid lesion, a long-standing dermatitis of the nipple which he originally described, and not with analogous lesions.—London *Lancet*.

American Women Students at Zurich University.—A society has been formed at Zurich by the American women who are studying for a doctorate at that place, and a circular has been issued by it conveying information to others who are looking forward to an educative tour in Europe. It is quoted in the *Consular Reports*, and a part of that quotation is given below: The length of time required for preparation is usually three to four years, except in the case of medicine, when five and a half years of very severe labor are necessary. A diploma from an American college is accepted in lieu of entrance examination. Certificates of successful teaching may also be accepted, but should be submitted in advance, as the decision appears to be made upon the merits of each case. In addition, a certificate of good character is necessary, and for an American, a passport. In the medical school, the entire course is laid down; elsewhere, no course is formulated, but each student is required to choose one major (Hauptfach) and two or three minors (Nebenfaecher). Work is carried on almost entirely by lectures and laboratory work, with occasional quizzes. The fees in Zurich are small. For a course of lectures coming once a week for a semester, the usual charge is 5 francs; for one coming twice a week, 10 francs, and so on. Seminars and quizzes are free. Even when a good deal of laboratory work is done, fees for the entire year rarely amount to more than $60 to $75. There is no university library. It is etiquette in Zurich for a student who is intending to take work with a given professor to call on him in advance at his house, preferably between 11 and 12 o'clock, to announce her intention, and, nominally, ask his advice. It is impossible to state too strongly

that no woman should come to Zurich with the immediate intention of university study, unless she has not only a reading but a speaking knowledge of German. Zurich is not the place to acquire this knowledge; the dialect which one hears almost everywhere in place of German and the number of foreigners of various nationalities in the town make it unsatisfactory for the language student. The university recognizes two classes of workers—the matriculated students and the hearers. The hearers are received without test of fitness, but are admitted to examination and receive certificates of having attended given courses of lectures only through the courtesy of the lecturers. The matriculated students have a few privileges not granted to hearers, and usually, though not necessarily, take an examination. The latter consist of the teacher, the doctor and the State examination. Of these, the second is the only one likely to be of especial interest to students who intend to return to America.

Washington.

COLUMBIA HOSPITAL.—The annual report of the Columbia Hospital for the year ended June 30, 1897, shows 55 patients in the hospital, July 1, 1896; admitted during the year 624; discharged or left during the year, 578; died, 36; remaining under treatment July 1, 1897, 47; death rate per cent. during year, 5.27; prescriptions compounded, 8,644; daily average of patients, 47.84; daily average of babies, 10.93.

PHYSICIANS TO THE POOR APPOINTED.—Drs. John W. Shaw and Rosier Middleton have been appointed alternate physicians to the poor.

DR. LINCOLN'S ILLNESS.—Dr. Lincoln, who has been seriously ill for some days past, is now convalescing and expects to be able to resume his practice very shortly.

FINED FOR ILLEGAL PRACTICE.—A colored laborer in one of the city drug stores has been engaged in practicing medicine illegally and was fined $50 in the police court.

ACCIDENT COMPANY SUED.—Suit has been entered in the district court against the Massachusetts Mutual Accident Association and the National Accident Society of New York, by the widow of the late Dr. Benjamin B. Adams to recover $5,000 from each of the defendant companies, on account of policies issued by them to her husband. The plaintiff claims that the companies have failed to pay the amount stated, though she satisfactorily complied with the rules of the company governing such cases.

Colleges.

THE MAINE MEDICAL SCHOOL may remove from Brunswick to Portland, in which latter city the sum of $100,000 has been pledged for the erection of suitable buildings. An attempt to realize $20,000 of the fund left by the late Joseph Walker to promote education may be frustrated inasmuch as the city of Portland has filed an application with the trustees of the fund for $26,000 wherewith to begin a manual training school.

Societies.

THE CANADIAN MEDICAL ASSOCIATION held its thirtieth annual meeting in Montreal, Canada, August 30, a day previous to the meeting of the British Medical Association. In compliment to the latter Association, some of whose members were present, words of greeting were expressed. After the necessary executive business, the following officers were elected: President, Dr. J. M. Beausoleil, Quebec; vice-presidents, Drs. A. M. McPhedraw, Toronto, C. S. Parke, Quebec, R. A. McKean, Glace Bay, T. R. Tuck, St. John, R. McNeil, Stanley Bridge, J. R. Jones, Winnipeg, F. C. McWheen, Lethbridge, and J. Tunstall, Vancouver; general secretary, Dr. F. N. G. Starr, Toronto; Treasurer, Dr. H. B. Small, Ottawa.

THE PUBLIC SERVICE.

Army Changes. Official List of Changes in the Stations and duties of officers serving in the Medical Department, U. S. Army, from August 21 to 27, 1897.

Capt. W. F. Carter, Asst. Surgeon (attending surgeon, Baltimore, Md.), is hereby granted leave of absence for one month, to take effect about Sept. 1, 1897.

Major Peter J. A. Cleary, Surgeon (chief surgeon, Dept. of Texas, San Antonio (Texas), is granted leave of absence for three months, with permission to go beyond sea.

CHANGE OF ADDRESS.

Behrens, B. H., from Minneapolis to Benson, Minn.
Bates, J. W. P., from 1020 E. Baltimore St. to 1830 Madison Av., Baltimore, Md.
Culbertson, Scott, from Moorefield to Vevay, Ind.
Cook, J. E., from 258 Pearl St. to 514 New England Bldg, Cleveland, Ohio.
Collins, K. R., from Philadelphia, Pa., to Alexandria, Ind.
Caldwell, C. E., from 447 Kimper Lane to 1110 Cross Lane, Walnut Hills, Cincinnati, Ohio.
Carpenter, Julia W., from Bay View, Mich., to 908 E. McMillan St., Cincinnati, Ohio.
Gould, J. B., from Minneapolis to Little Falls, Minn.
Guerard, A. R., from 162 E. 114th St. to 2143 7th Av., N. E. cor. 127th St., New York, N. Y.
Gallant, A. Ernest, from 10 W. 36th St. to 60 W. 56th St., New York, N. Y.
Hardman, R. H., from Washington, D. C., to Converse, Ind.
Hengst, D. A., from 515 Penn Av. to 1005 Park Bldg. Pittsburg, Pa.
Koch, I. M., from 706 N. 20th St. to 200 S. 12th St., Philadelphia, Pa.
Lunde, C. A., from Chicago to 252 Woodward Av., Detroit, Mich.
McCurdy, S. L., from 515 Penn Av. to 1023 Park Bldg. Pittsburg, Pa.
Prentiss, D. Webster, from Haven, Me., to Washington, D. C.

LETTERS RECEIVED.

Alden, C. H., Washington, D. C.; Ashmun, G. C., Cleveland, Ohio; American Gynecological and Obstetrical Journal, The, New York, N. Y.
Bryan, D. C., Omaha, Neb.; Brophy, Truman W., Chicago, Ill.; Baker, Louis B., Erie, Pa.; Bohl, J., Watertown, Ohio; Brown, H. W., Cleveland, Ohio; Bell, D. C., McBride, Mich.; Baltimore Medical College, Baltimore, Md.
Christopher, A., St. Joseph, Mo.; Crowe, J. M., Washington, D. C.; Crafts, Leo M., Minneapolis, Minn.; Chadle, S. E., Toronto Canada; Chapman, O. S., Minneapolis, Minn.; Creighton Medical College, John A., Omaha, Neb.; Conkling, Price & Webb, Chicago, Ill.; Caldwell & Co. (Inc'd), New York, N. Y.; Clifford, J. W., Holland, Ind.
De Lee, J. B., Chicago, Ill.; Daniel, J. B., Atlanta, Ga.; Dios Chemical Co., St. Louis, Mo., (3).
Elliott, A. R., New York, N. Y.; Egan, J. A., Springfield, Ill.
Fite, C. C., New York, N. Y., (2); Fairbairn, Wm., Detroit, Mich.; Fougera, E. & Co., New York, N. Y.
Gould, M. P., New Haven, Conn.
Herdman, W. J., Frankfort, Mich.; Hummel, A. L., Adv. Agency, New York, N. Y.; Hoagland, George A., St. Louis, Mo.; Hobson, J. F., Cleveland, Ohio; Henrotin, F., Chicago Ill.; Hansen, C. C., Mosul, Turkey in Asia; Harrison, E. E., W. Concord, Minn.; Harris, L. J., Pittsford, Mich.; Houghton, Mifflin & Co., Boston, Mass.; Hoff, J. W., Pomeroy, Ohio.
Josephi, S. E., Portland, Ore.; Johnson, H. L. E., Washington.
Kress & Owen Company, New York, N. Y.
Lewis, Daniel, New York, N. Y.; Loeb, H. W., St. Louis, Mo.
Mitchell, C. W., Baltimore, Md.; Marsee, J. W., Indianapolis, Ind.; Magruder, G. L., Washington, D. C.; Morrissey, J. J., New York, N. Y.; Merrick, M. B., Passaic, N. J.; Minor, J. C., Hot Springs, Ark.
Newman, W. H., Grinnell, Iowa; Newell & Heldman, Chicago, Ill.
Opie, Thomas, Baltimore, Md.
Pope, Curran, Louisville, Ky.; Procter & Collier Co., Cincinnati, Ohio; Paquin Laboratories, Paul, St. Louis, Mo.; Pelletier, L., Montreal, Canada.
Ridgway, J., Minneapolis, Minn.; Ryfkogel, H. A. L., Oakland, Cal.; Rochelle, W. F., Jackson Tenn.; Reed, W. W., Boulder, Colo.; Reed, R. Harvey, Columbus, Ohio; Rio Chemical Co., St. Louis, Mo.
Swain, O. A. T., New Bedford, Mass.; Sharrer, A. D., Flint, Mich.; Stewart, F. E., Detroit, Mich.; Stowell, C. H., Washington, D.C.
Trelease, William, St. Louis, Mo.; Tuley, H. E., Louisville.
Wyman, Hal C., Detroit, Mich.; Wherrell, John, Kansas City, Mo.; Wilson, Louis N., Worcester, Mass.; Wilson, Fred C., Colesburg, Iowa.

PAMPHLETS RECEIVED.

Adductor Vocal Paralysis. By Lewis S. Somers, M.D. Paper, Reprinted from the Medical News.
Annual Report of the Essex County Hospital for the Insane. Paper, 92 pages. Newark, N. J. 1897.
A Plea for a Uniform Diastase Test. By C. C. Fite, M.D. Paper. Reprinted from Journal of the American Medical Association.
Arkansas Industrial University, Medical Department. Catalogue and Announcement. 1897-98.
Clark University, Ninth Official Announcement. 1897-98.
College of Medicine of University of Southern California, Thirteenth Annual Announcement.
Etheriana. By Albert S. Ashmead. Paper, 12 pages. New York.
Eighteen Years of Personal Observation of Tuberculosis in Asheville, N. C. By John Hey Williams, M.D. Paper. Reprinted from Journal of the American Medical Association.
Influence of Diseases of the Nares and Pharynx on Aural Affections. . . . By Lewis S. Somers. Paper. Reprinted from University Medical Magazine.
Manitoba Medical College (Winnipeg). Annual Announcement. 1897-98.
Medical Department, Tulane University of Louisiana. 1897-98.
Recitation vs. the Lecture System of Teaching Medicine, The. By L. J. Chapman, A.M., M.D. Paper. Reprinted from Columbus Medical Journal.
Studies in Temperature. By Mark A. Brown, M.D. Paper. Reprinted from Lancet-Clinic.
Tuberculosis of the Tonsils, Pharynx and Larynx. By Lewis S. Somers, M.D. Paper. Reprinted from Medical and Surgical Reporter.
University of Denver, Department of Medicine. Announcement for 1897-98.
University of Tennessee, Medical Department. Announcement for 1897-98.
Vaginal vs. Abdominal Section for Pus in the Pelvis. By Wm. D. Haggard, Jr., M.D. Paper. Reprinted from American Gynecological and Obstet. Journal.